

# CCD-V50E

## SERVICE MANUAL

*AEP Model  
UK Model  
E Model*



## Handycam DIGITAL Video 8

### SPECIFICATIONS

This manual contains the **SUPPLEMENT-1**.

#### System

Video recording system	Rotary two heads, Helical scanning FM system
Audio recording system	Rotary head, FM system
Video signal	PAL colour, CCIR standards
Usable cassette	8 mm video format cassette
Tape speed	SP: Approx. 20.051 mm/sec. LP: Approx. 10.058 mm/sec.
Recording or playback time	SP: 90 min. (P5-90) LP: 180 min. (P5-90)
Fast forward time	Approx. 6 min. 15 sec. (P5-90)
Image device	CCD (Charge Coupled Device)
Viewfinder	VF-240/241 electronic viewfinder (0.7" black and white)
Lens	Combined 6 × power zoom lens f = 12-72 mm, F1.6 with macro Filter diameter: 46 mm
Auto focus system	TCL
Colour temperature	Preset values: ☀ 5,800K ☀ 3,200K Auto: From the light at a tungsten lamp to the light on a slightly overcast day.
Minimum illumination	13 lux
Illumination range	13 lux-100,000 lux (1.1-9,294 footcandles)
Recommended illumination	More than 300 lux (28 footcandles)
Aperture correction	Automatic

#### Input and output connector

Video output	Phono jack, 1 Vp-p, 75 ohms unbalanced sync negative
Audio output	Phono jack, -10dBs, at output impedance less than 2.2 kilohms
RFU DC OUT	Special minijack, 5V DC, for the RFU-88E/AS only
MIC jack	Minijack, -66 dBs, low impedance With 2.5-3 V DC output, impedance 6.8 kilohms
Microphone power output jack	Special minijack, 5 V DC

#### Display in the viewfinder

Mode and caution indicators
Mode: REC/STBY
INDOOR/OUTDOOR
BACK LIGHT
Caution: BATTERY
DEW
TAPE END
CASSETTE
LOW LIGHT
CAUTION
Time/date indication
Title colour indication

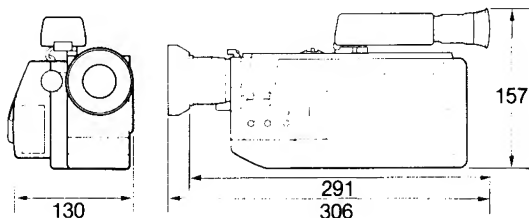
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**8 VIDEO CAMERA RECORDER**  
**SONY**®

### General

Power requirements	Battery compartment 6 V/8.5 V
Power consumption	7.3 W (camera recording) including the viewfinder
Installation	Vertically
Operating temperature	0°C to 40°C (32°F to 104°F)
Storage temperature	-20°C to +60°C (-4°F to +140°F)
Dimensions	Approx. 130 × 157 × 291 mm (w/h/d) (5 1/8 × 6 1/4 × 11 1/2 in.)



Weight	Approx. 1.5 kg (3 lb 5 oz) excluding the battery and cassette
Microphone	Electret condenser microphone, omni-directional monaural type
Supplied accessories	Lithium battery (1) Shoulder strap (1)

### Optional accessories

Carrying case LCH-V50, BP-400  
Battery pack NP-22, NP-4000, BP-400  
DC pack DCP-80  
Car battery cord DCC-16AE  
External microphone ECM-Z200, ECM-K120  
External microphone shoe SAD-100  
Connecting cable VMC-710M/720M (2 phono to 2  
phono), VMC-262M (2 phono to 6-pin), VMC-2104M (4  
phono to 21-pin)

Design and specifications are subject to change  
without notice.

Your dealer may not handle some of the above  
listed optional accessories. Please ask the dealer for  
detailed information about the optional accessories  
available in your country.

### Note

This appliance conforms with EEC Directives 76/889  
and 82/499 regarding interference suppression.




## **SAFETY CHECK-OUT**

After correcting the original service problem, perform the following safety checks before releasing the set to the customer:

1. Check the area of your repair for unsoldered or poorly-soldered connections. Check the entire board surface for solder splashes and bridges.
2. Check the interboard wiring to ensure that no wires are "pinched" or contact high-wattage resistors.
3. Look for unauthorized replacement parts, particularly transistors, that were installed during a previous repair. Point them out to the customer and recommend their replacement.
4. Look for parts which, though functioning, show obvious signs of deterioration. Point them out to the customer and recommend their replacement.
5. Check the B+ voltage to see it is at the values specified.

### **SAFETY-RELATED COMPONENT WARNING !!**

COMPONENTS IDENTIFIED BY SHADING AND MARK  ON THE SCHEMATIC DIAGRAMS, EXPLODED VIEWS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY. CIRCUIT ADJUSTMENTS THAT ARE CRITICAL TO SAFE OPERATION ARE IDENTIFIED IN THIS MANUAL. FOLLOW THESE PROCEDURES WHENEVER CRITICAL COMPONENTS ARE REPLACED OR IMPROPER OPERATION IS SUSPECTED.

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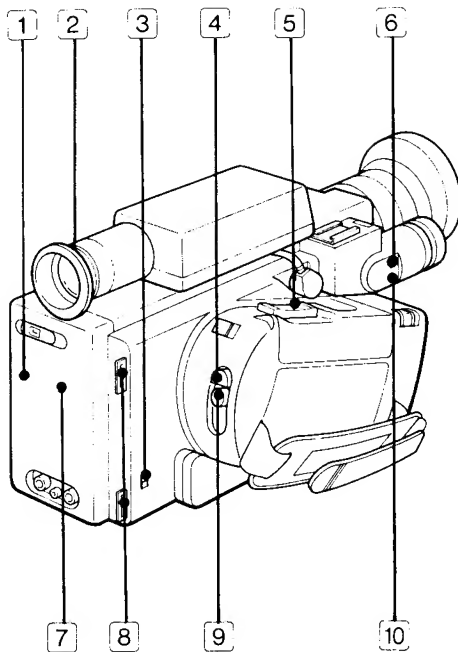
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# SECTION 1 GENERAL

## 1-1. LOCATION AND FUNCTION OF PARTS AND CONTROLS

**A-1**



For details on the use of each control, refer to the pages indicated in the circle.

**A-1**

### **1 BATTERY/CAUTION lamp**

Blinks when the battery is exhausted, and lights up when the unit cannot record normally.

### **2 Viewfinder lens adjustment ring ⑬**

Adjust to your eyesight to assure good focus. Be sure to adjust this knob when shooting for the first time.

### **3 REC MODE (recording mode)/EDIT switch**

Switch it depending on the operating mode.

Mode	Recording	Playback	Editing
Setting	<div> <div>SP</div> <div>LP</div> </div>	<div> <div>EDIT</div> </div>	<div> <div>EDIT</div> </div>
Function	REC MODE switch	EDIT switch	

### **4 STANDBY switch ⑭**

Slide up to set the unit to recording pause mode.

### **5 Power zoom button ⑳**

### **6 MIC (external microphone) jack**

### **7 DEW lamp**

Lights up when moisture has condensed inside the unit.

### **8 Hooks for shoulder strap**

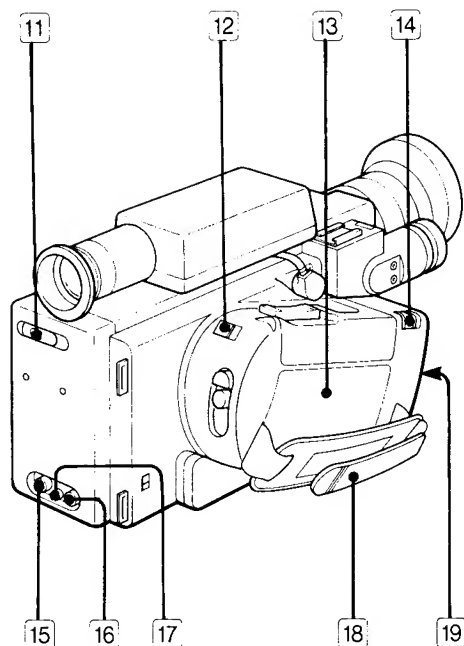
Attach a shoulder strap.

### **9 START/STOP button ⑮**

Press to start and stop camera recording.

### **10 DC OUT (DC output) jack**

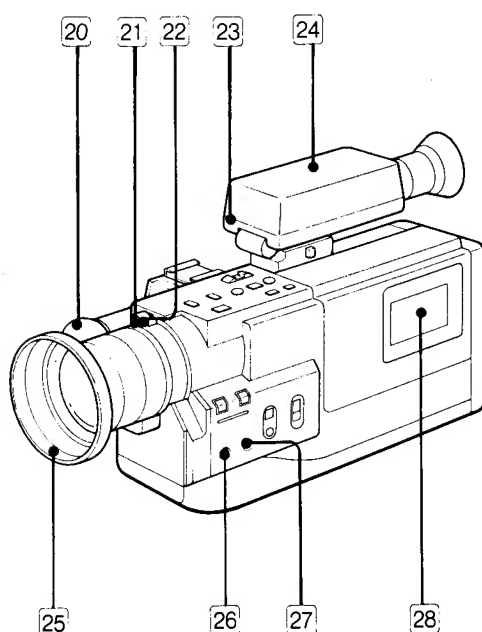
## A-2



## A-2

- 11 Cassette eject button
- 12 GRIP RELEASE switch ⑩
- 13 Grip
- 14 BATT EJECT (battery eject) switch ⑫
- 15 VIDEO OUT (video output) jack (phono jack)
- 16 AUDIO OUT (audio output) jack (phono jack)
- 17 RFU DC OUT (RFU adaptor DC output) jack (special minijack)  
Supplies power to the RFU-88E/AS RFU adaptor.
- 18 Grip strap ⑩
- 19 Battery compartment ⑫

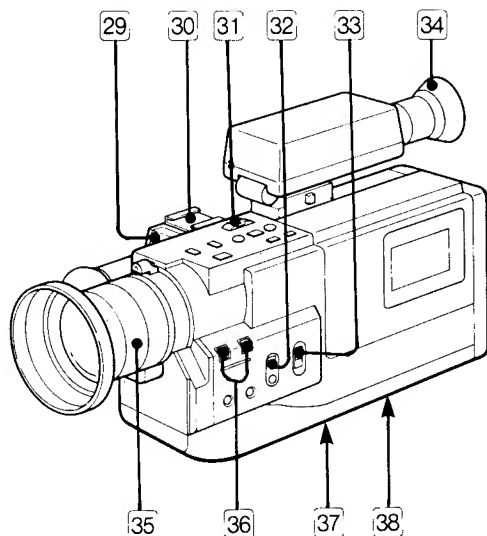
## A-3



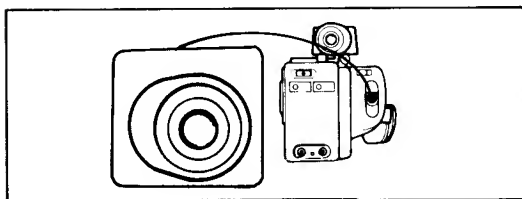
## A-3

- 20 Built-in microphone (monaural)
- 21 Zoom lever ⑫
- 22 Macro set button ⑫
- 23 Camera recording/battery lamp  
Lights during camera recording. It blinks when the battery is exhausted.
- 24 Viewfinder ⑨⑪  
The picture being recorded or played back can be monitored in monochrome here. Also, data such as caution indicators and function mode are displayed on the viewfinder screen.  
  
On the bottom of the viewfinder  
☀ : **Brightness control screw**  
⊗ : **Focus control screw**  
Normally, there is no need to adjust these screws. Adjust only when the picture is not displayed clearly.
- 25 Lens hood
- 26 BACK LIGHT button ②
- 27 REC REVIEW (recording review) button ⑮
- 28 Cassette holder

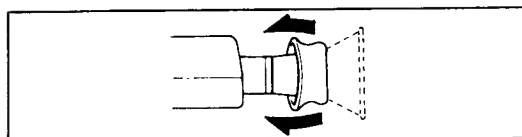
#### A-4



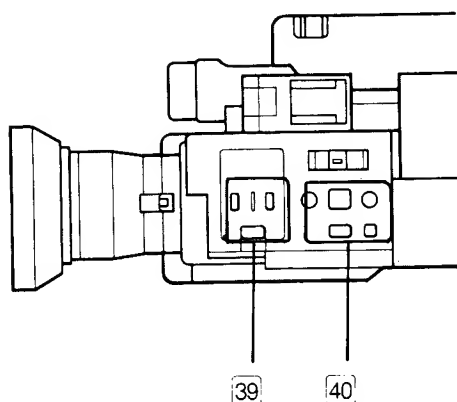
#### A-5



#### A-6



#### A-7



#### A-4

##### 29 White balance sensor

This is the sensor for auto white balance adjustment.

##### 30 Accessory shoe

Attach an optional external microphone or video light here.

##### 31 POWER switch

CAMERA: For camera recording  
PLAYER: For playing back or editing tapes  
OFF: Power off

##### 32 FOCUS switch

Normally set to AUTO for auto focusing. To focus manually, set to MAN (manual). To activate the auto focusing function briefly when the switch is set to MAN, hold down the PUSH AUTO button.

##### 33 WHITE BAL (white balance) switch

Normally set to AUTO for auto white balance adjustment.  
Set it to ☀ (outdoors), or 🏠 (indoors) for manual adjustment.

##### 34 Eyecup

The eyecup is attached for the right eye. For the left eye, detach the rubber eyecup and attach it as illustrated. **A-5**  
To view while wearing glasses, fold out the eyecup as illustrated. **A-6**

##### 35 Focus ring

##### 36 DATE and TIME SET buttons ⑭

Press to display or turn off the date or time. Keep these buttons depressed simultaneously for more than 3 seconds to enter date and time setting mode.  
In the setting mode, the DATE SET button functions as the + button and the TIME SET button functions as the NEXT button.

##### 37 Tripod receptacle

##### 38 Lithium battery compartment ⑮

#### A-7

##### 39 SUPERIMPOSE buttons ⑯

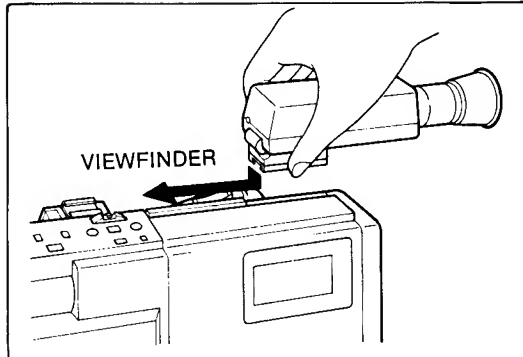
MEM (memory) button  
COLOR button  
ON/OFF button

##### 40 Tape transport buttons ⑰

◀ (playback)  
◀◀ FF (fast forward)  
▶▶ REW (rewind)  
■ (stop)  
|| (pause)

## 1-2. HOW TO ATTACH THE VIEWFINDER

**B-1**



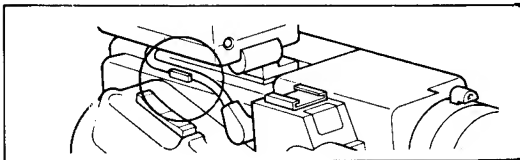
- 1 Slide the viewfinder onto the viewfinder shoe, while pressing the lock/release button on the side of the viewfinder. **B-1**
- 2 Slide the viewfinder all the way forward and release the lock/release button.
- 3 Move the viewfinder back and forth until it locks.
- 4 Plug the connecting cord into the VIEWFINDER jack and fix the cord. **B-2**

### For the easiest shooting

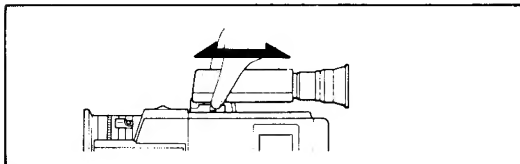
The viewfinder can be locked in 3 positions. Select the most comfortable position while pressing the lock/release button. **B-3**

When shooting from a low angle, you can raise the viewfinder up to 90°. **B-4**

**B-2**



**B-3**

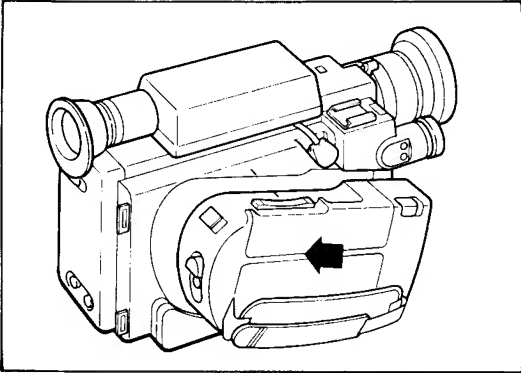


**B-4**



### 1-3. HOW TO ATTACH THE GRIP

**C-1**



**To attach the grip** **C-1**

- 1 Align the marks.
- 2 Pull the grip until it locks.

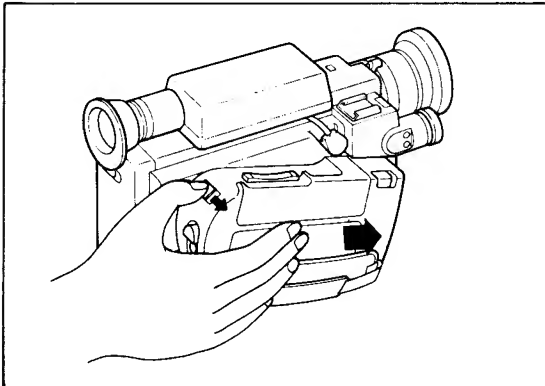
**To detach the grip** **C-2**

Slide the grip off while sliding the GRIP RELEASE switch on it.

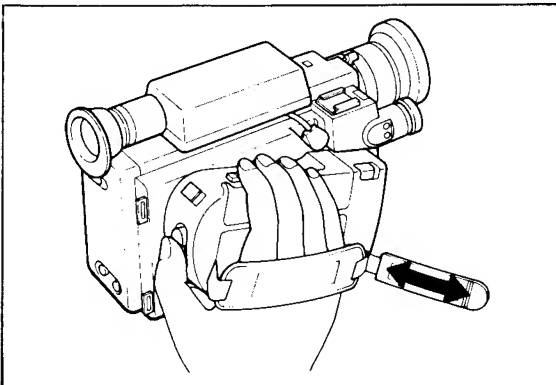
**To adjust the length of the grip strap** **C-3**

Adjust the length so that your thumb can easily manipulate the START/STOP button.

**C-2**



**C-3**





## 1-4. POWER SOURCES

### SELECTION OF POWER SOURCES

Operate the unit on one of the following power sources.

Place	Power source	Accessory to be used
Outdoors	Battery pack	<b>NP-22 battery pack</b> (page 11)
		<b>NP-4000 battery pack and DCP-80 DC pack</b> (page 12)
Indoors	House current	<b>ACP-88 AC pack</b> (page 13)
In cars	12 V or 24 V car battery	<b>DCP-80 DC pack and DCC-16AE car battery cord</b> (page 13)

#### Note on power source

Do not disconnect the power source or remove the battery pack during recording or playback, because it may damage the inserted cassette tape. If disconnected accidentally, supply the power again immediately.

### FOR OUTDOOR USE — battery pack

#### How to charge D-1

Use the ACP-88 AC pack and the BCA-70 battery charge adaptor.

The charging time is about 1.5 hours using the ACP-88.

- 1 Insert the NP-22 and the ACP-88 with the metal contacts facing inside.
- 2 Connect the AC power cord of the ACP-88 to a wall outlet.

The charging will stop automatically when the battery is fully charged, and the CHARGE lamp of the BCA-70 will go out.

#### Battery life

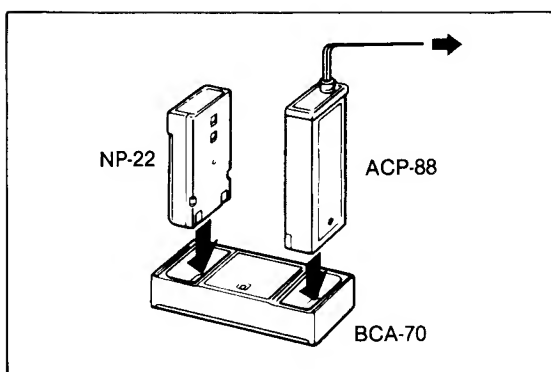
A fully-charged battery provides approximately 1 hour of continuous operation at normal temperatures.

When the battery is exhausted, the BATTERY lamp outside the unit and the BATTERY indicator inside the viewfinder screen blink and the power will be turned off automatically in one minute or so. Replace the battery pack with a charged one.

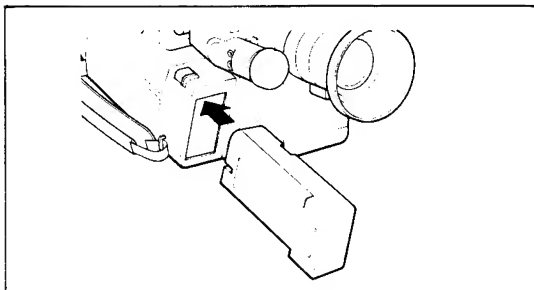
#### NOTES

- The video camera recorder consumes power even in the recording pause mode. Therefore, for every hour's worth of tape you plan to shoot, expect to use 2 to 3 hours' worth of battery power.
- If the battery pack is not fully charged or if it is used in a cold place, its operating time is also shortened.
- After each use, be sure to recharge the battery pack.

D-1



**D-2**



**To insert the battery pack D-2**

Insert the battery pack with the metal contacts facing inside.

**To remove the battery pack D-3**

Slide the BATT EJECT switch while pushing the battery pack.

**NP-4000 and DCP-80 D-4**

A fully-charged NP-4000 (optional) battery pack provides approximately 5 times longer operation than an NP-22.

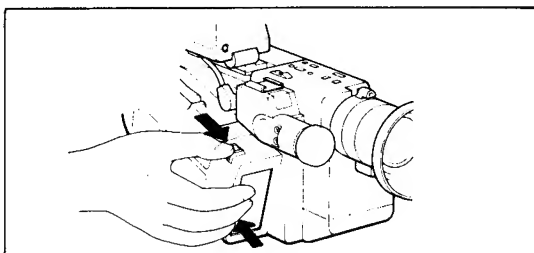
When using the NP-4000, an optional DCP-80 DC pack is required.

First insert the DCP-80 into the battery compartment of the video camera recorder and then connect it to the NP-4000.

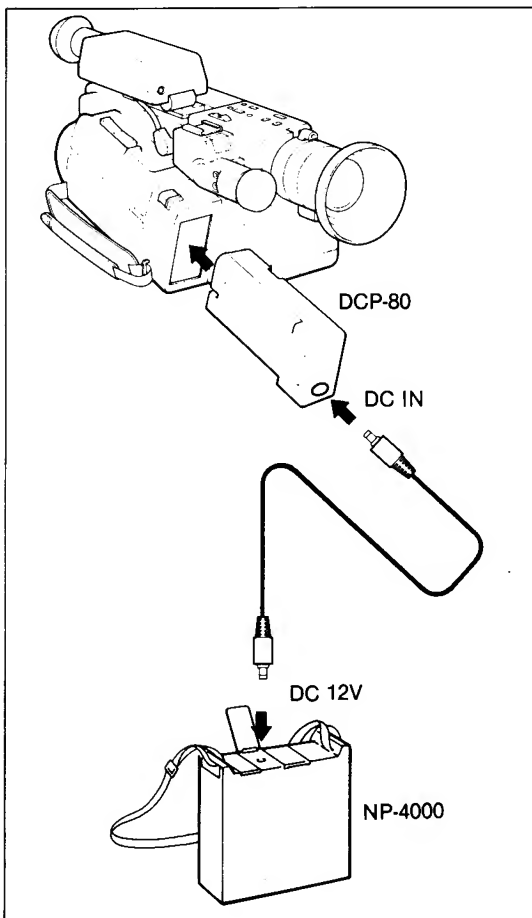
To remove the DC pack, slide the BATT EJECT switch while pushing the DC pack.

When charging the NP-4000, use the battery charger supplied with the NP-4000. The charging time is about 10 hours. D-5

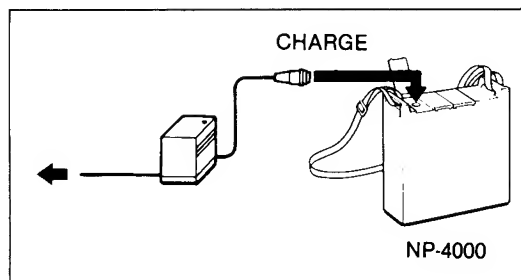
**D-3**



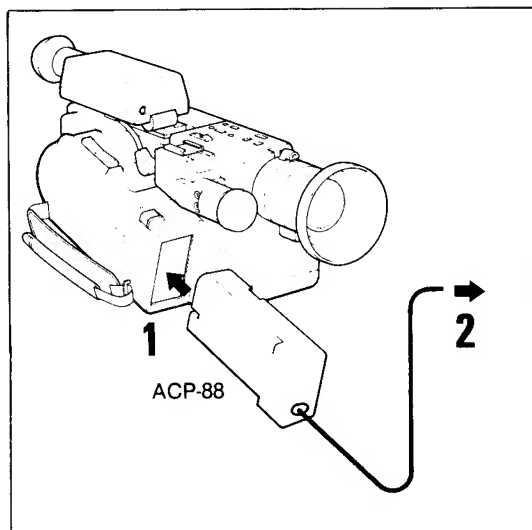
**D-4**



**D-5**



**E**



### FOR INDOOR USE — AC pack

#### Connection **E**

- 1 Insert the ACP-88 AC pack with the metal contacts facing inside.
- 2 Connect the AC power cord of the ACP-88 to a wall outlet.

To remove the AC pack, slide the BATT EJECT switch while pushing the AC pack.

### FOR USE IN CARS

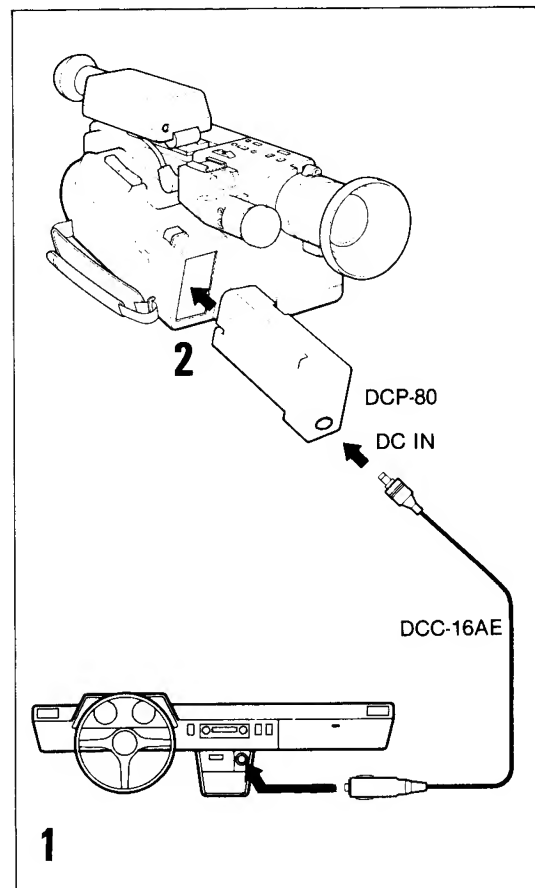
#### Connection **F**

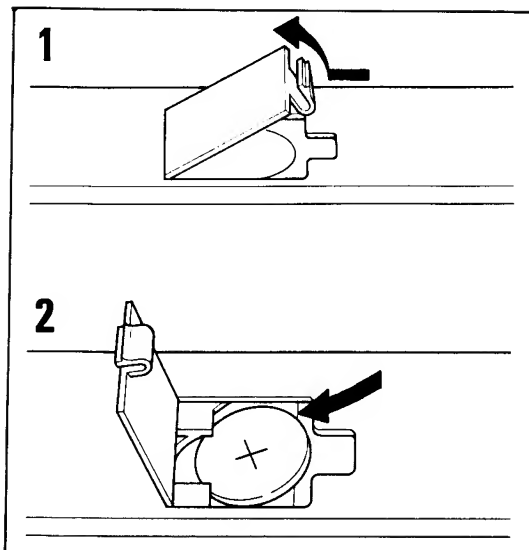
Use the DCP-80 DC pack and the DCC-16AE car battery cord.

- 1 Connect the DCC-16AE to the DC IN jack of the DCP-80 and to the cigarette lighter socket of the car.
- 2 Insert the DCP-80 into the battery compartment of the video camera recorder.

To remove the DC pack, slide the BATT EJECT switch while pushing the DC pack.

**F**



**G****LITHIUM BATTERY G**

This unit uses a lithium battery to activate the clock and to keep a title in memory. Before operating the unit for the first time, install the supplied lithium battery:

- 1 Open the cover of the lithium battery compartment.
- 2 Install the supplied CR2025 lithium battery with the ⊕ side facing out.
- 3 Close the cover.

**LITHIUM BATTERY LIFE**

Approximately 1 year in normal operation.

When the lithium battery becomes weak, the time indication will blink on the viewfinder screen for about 7 seconds.

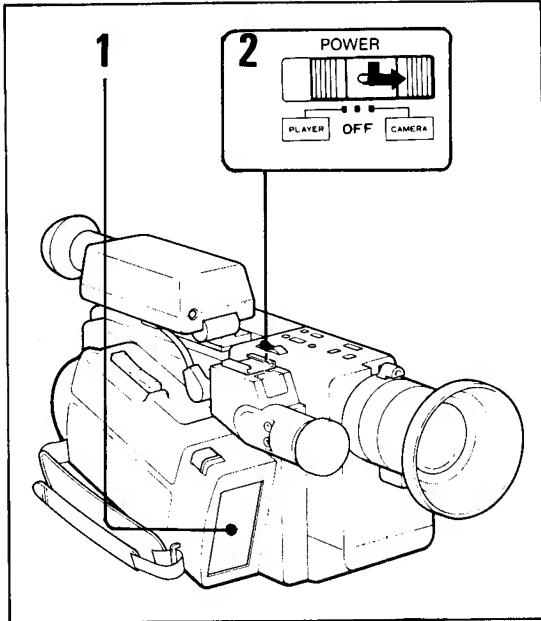
When the battery is completely exhausted, "0:00:00" will blink for about 7 seconds and then go off. If you press the DATE or TIME button after that, "1.1.1987" or "0:00:00" will blink. Replace the battery with a new Sony CR2025 lithium battery in good time.

**NOTES ON LITHIUM BATTERY**

- Keep the lithium battery out of the reach of children. Should the battery be swallowed, immediately consult a doctor.
- Wipe the battery with a dry cloth to assure a good contact.
- Be sure to observe the correct polarity when installing the battery.
- Do not hold the battery with metallic tweezers, otherwise a short-circuit may occur.
- Do not break up the battery nor throw it into a fire, which might cause it to explode. Carefully dispose of the used batteries.

## 1-5. PREPARATION FOR CAMERA RECORDING

**I-1**



[ 1 ] Connect a power source, and set the POWER switch to CAMERA. **I-1**

[ 2 ] Adjust the position of the viewfinder lens. **I-2**

The position of the viewfinder lens for optimum vision varies depending on the person.

Remove the lens cap.

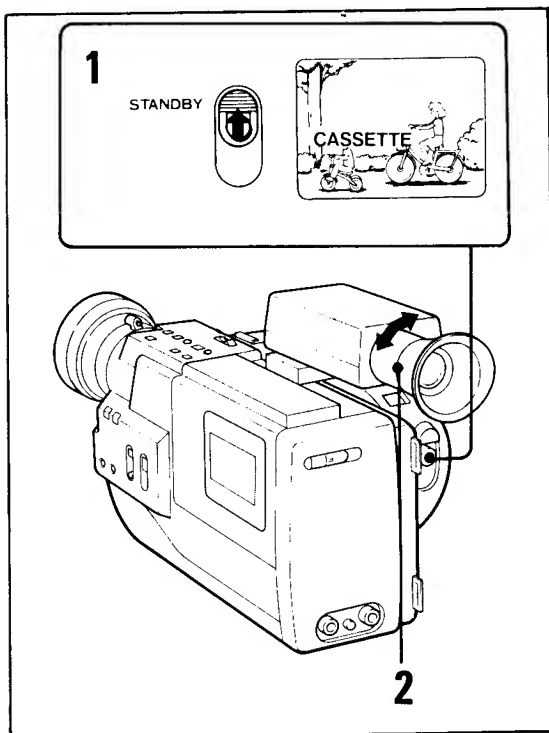
- 1 Slide the STANDBY switch up.
- 2 Turn the viewfinder lens adjustment ring so that the indicator displayed on the viewfinder screen come into sharp focus.

Adjustment of the position of the viewfinder lens is necessary only for your initial use, or for use after someone else.

### NOTE

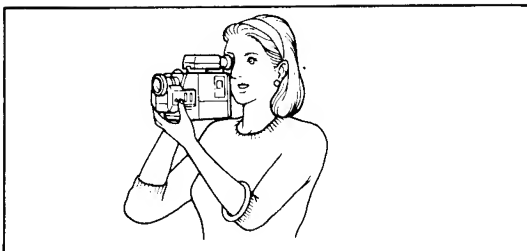
If you leave the unit in the recording pause mode for 7 minutes or more, the unit will be automatically turned off. To resume recording pause mode, slide the STANDBY switch down once and slide it up again.

**I-2**

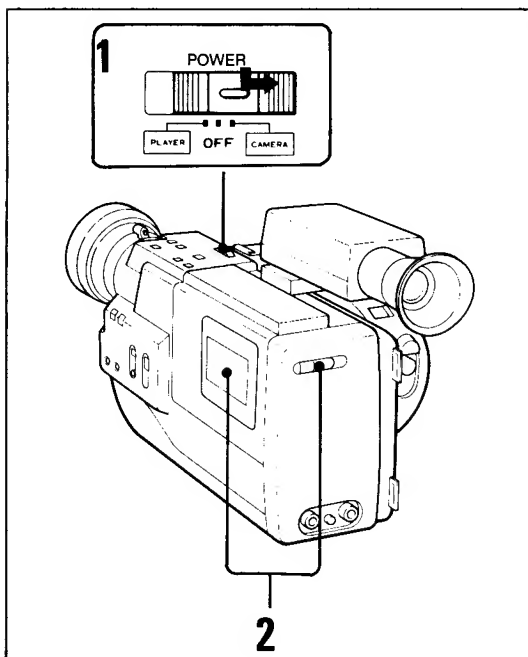


## 1-6. EASY CAMERA RECORDING WITH AUTOMATIC ADJUSTMENT

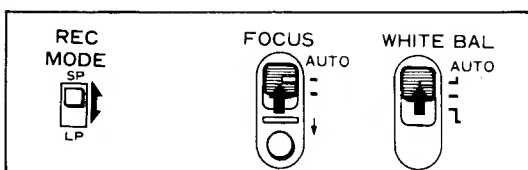
**J-1**



**J-2**

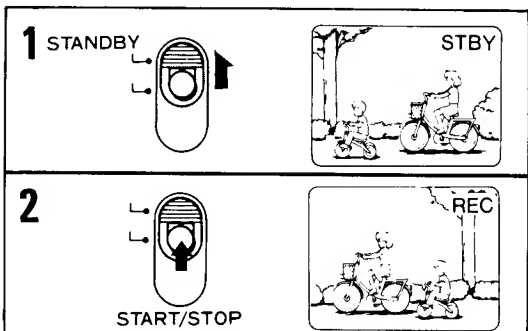


**J-3**



**J-4**

**J-5**



### HOW TO RECORD

Hold the camera recorder as in the illustration.

**J-1**

[1] Set the POWER switch to CAMERA, and insert a cassette. **J-2**

[2] Set the REC MODE switch to LP or SP, according to the length of the programme to be recorded. **J-3**

The recording time of a cassette in the LP mode is twice as long as that in the SP mode.

[3] Set the following switches to the standard position for automatic adjustment. **J-4**

- FOCUS switch → AUTO (auto focusing)
- WHITE BAL switch → AUTO (linear auto white balance adjustment)

[4] Start recording. **J-5**

- 1 Slide the STANDBY switch up.  
The unit will enter the recording pause mode.
- 2 Press the START/STOP button.  
Recording will start.

#### Check on the viewfinder screen

STBY: Displayed during recording pause mode.  
REC: Displayed during recording.

#### To stop recording

Press the START/STOP button again.  
The unit will enter the recording pause mode.

#### To check the last portion of the previous recording

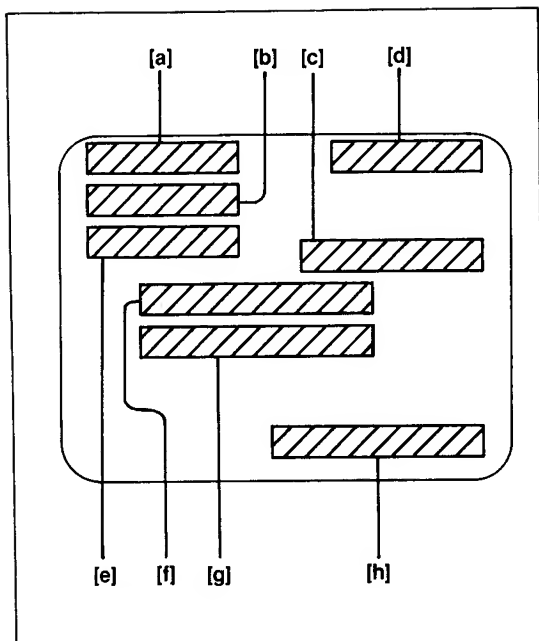
Press the REC REVIEW button.

The last few seconds of the recorded portion are rewound and then the recorded picture is monitored on the viewfinder screen. The unit then enters the recording pause mode.

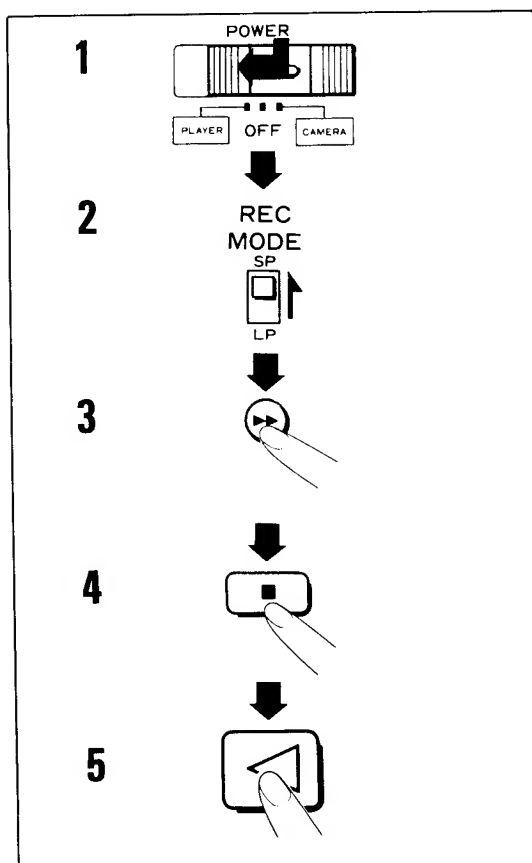
#### After using

Slide the STANDBY switch down and set the POWER switch to OFF. (You need not press the center button when setting the switch to OFF).

**K**



**L**



## INDICATIONS INSIDE THE VIEWFINDER **K**

- [a] OUTDOOR**  
The WHITE BAL switch is set to ☀.
- INDOOR**  
The WHITE BAL switch is set to 🌙.
- [b] BACK LIGHT**  
The BACK LIGHT button has been pressed (see page 21).
- [c] Title colour** (see page 26).
- [d] STBY**  
Recording is momentarily stopped (recording pause mode).
- REC**  
Recording is going on.
- [e] LOW LIGHT**  
Insufficient light.
- [f] BATTERY**  
Weak battery.
- CAUTION**  
The unit cannot function normally.
- DEW**  
Moisture condensation inside the unit
- [g] CASSETTE**  
No cassette has been inserted or the safety tab of the inserted cassette is slid out.
- TAPE END**  
The tape is at its end.
- [h] Date or time** (see page 24).

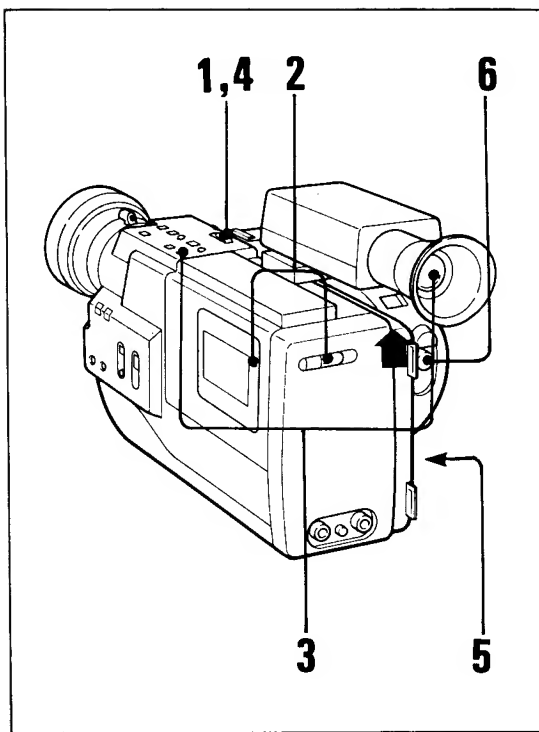
## INSTANT PLAYBACK ON THE SPOT **L**

- 1 Set the POWER switch to PLAYER.
- 2 Set the REC MODE/EDIT switch in the upper position.
- 3 Rewind the tape with the >>> button.
- 4 Stop the tape with the ■ button.
- 5 Start playback with the <<< button.

The playback picture will appear on the viewfinder screen.

To resume recording in the LP mode, slide the REC MODE/EDIT switch down.

**M**



## **SMOOTH RECORDING M**

A smooth transition between scenes can be made after the recording is stopped or the unit is turned off, provided that the cassette isn't removed.

To record smoothly after having removed the cassette, proceed as follows.

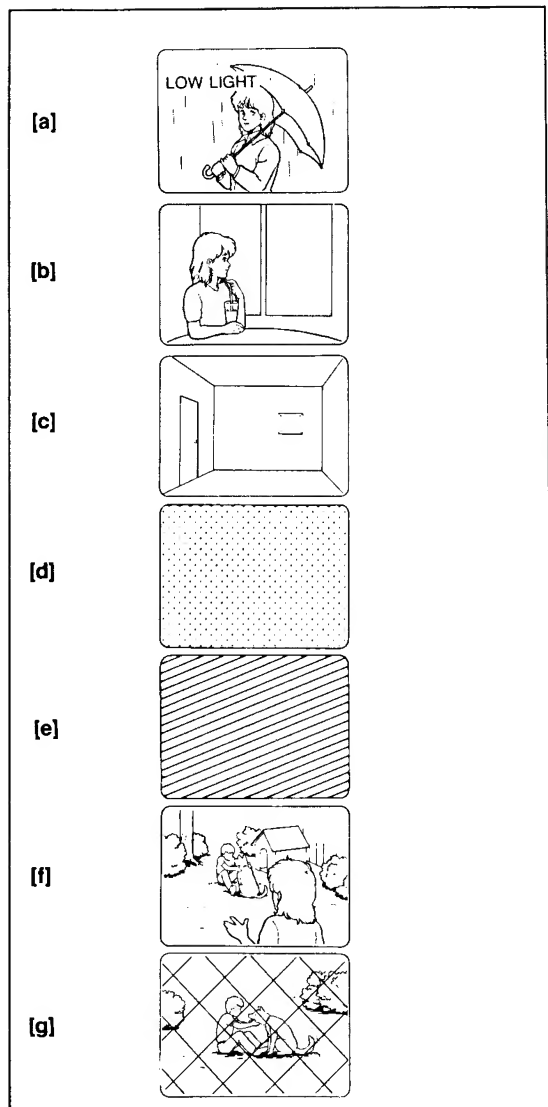
- 1 Set the POWER switch to PLAYER.**
- 2 Insert the cassette.**
- 3 Looking at the playback picture on the viewfinder screen, press the **II** button where you want to restart recording.**
- 4 Set the POWER switch to CAMERA.**
- 5 Select the same recording mode with the REC MODE/EDIT switch as was used for the already recorded portion.**
- 6 Slide the STANDBY switch up, and press the START/STOP button.**

Recording will start.

It is helpful to note on the cassette the mode, SP or LP, in which it was recorded.



**N-5**



**N-6**



## 1-7. MANUAL FOCUSING

### POOR CONDITIONS FOR AUTO FOCUSING **N-5**

- [a] Insufficient light
- [b] Too much bright light behind the subject
- [c] Subjects with flat colours and less contrast—wall, sky, etc.
- [d] Finely detailed repetitive patterns
- [e] Slant stripes
- [f] When the distance between subjects at the center is extreme (e.g. one subject is close, the other is away)
- [g] Subjects beyond screens, nets, etc. or when another subject passes across the camera

### OTHER USES OF MANUAL FOCUSING

- When using special effects lenses or filters
- When shooting still subjects on a tripod
- To save battery wear  
(When the FOCUS switch is set to AUTO, the auto focusing operates to move the focus ring automatically even in recording pause mode. This causes the battery to wear continuously.)
- For focusing in close-up shooting, see page 23.

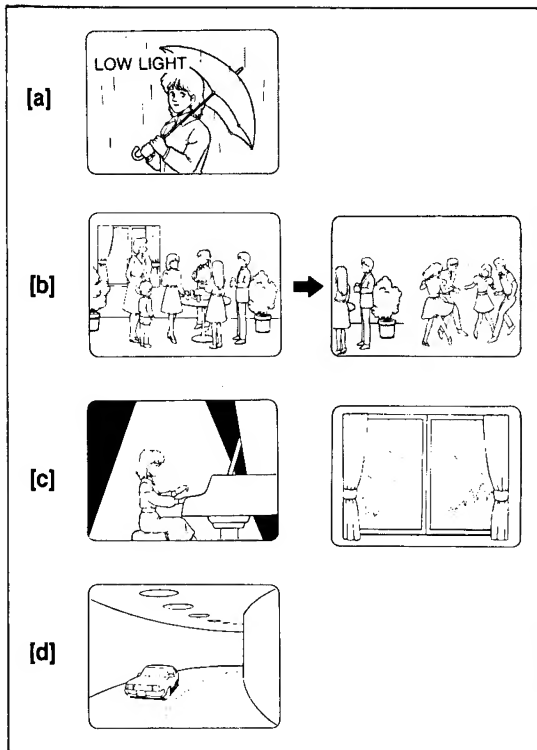
#### TCL AUTO FOCUSING SYSTEM

The TCL (Through Camera Lens) auto focusing system incorporated in this unit utilizes high-precision sensors to determine picture contrast at the center of the viewfinder screen (the portion marked with the blue bar in the illustration) and adjust focus accordingly for automatic, highly accurate focusing. **N-6**

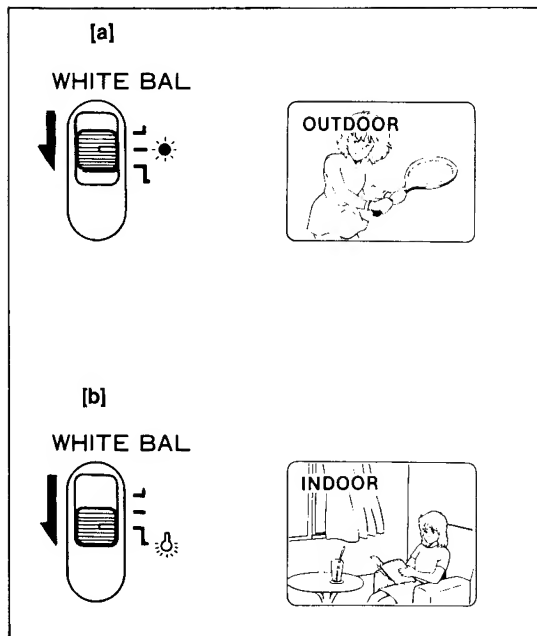
#### NOTE

It may take several seconds to get focus when the camera is rapidly panned from a near subject to a distant subject with less contrast.

## O-1



## O-2



## 1-8. WHITE BALANCE ADJUSTMENT

Adjustment of white balance is for recording the picture with natural colour tone without reference to the condition of the light source.

Set the position of the WHITE BAL switch manually when shooting under certain conditions (listed below).

### POOR CONDITIONS FOR LINEAR AUTO WHITE BALANCE ADJUSTMENT O-1

- [a] Insufficient light
- [b] When lighting conditions change quickly
- [c] When the light condition for the subject is different from that for the unit  
e.g. when the subject is in a spotlight when the subject is outdoors but the camera is indoors
- [d] Special light sources such as sodium lamp, etc.

### HOW TO SET THE WHITE BAL SELECTOR O-2

- [a] **Recording outdoors**—Set to ☀ (5800K).  
(OUTDOOR indicator appears on the viewfinder screen.)
- [b] **Recording indoors**—Set to 🏠 (3200K).  
(INDOOR indicator appears on the viewfinder screen.)

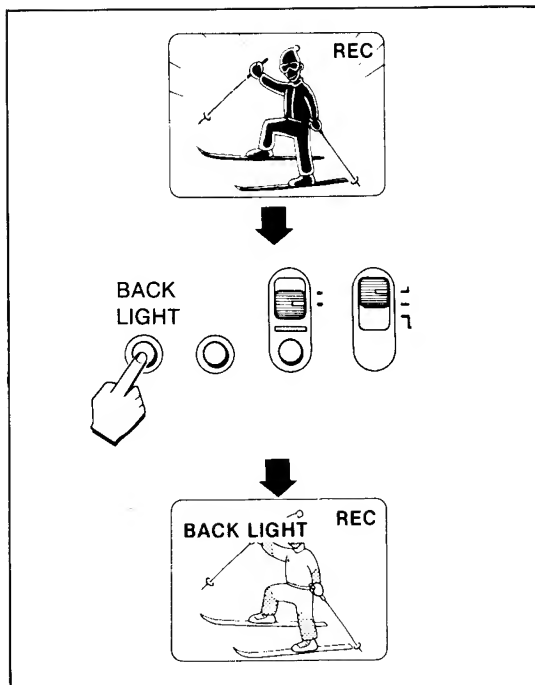
### Recommended settings for various subjects

- ☀: sunset, fireworks, subjects beside a sunny window, etc.
- 🏠: candle flames in darkness, subjects in the spotlight, scenes before sunrise, subjects in a tunnel (illuminated by sodium lamps), neonlights, etc.

### LINEAR AUTO WHITE BALANCE SYSTEM OF THIS CAMERA RECORDER

Utilizes a white balance sensor to determine the colour temperature of the ambient light and adjust the white balance accordingly. As the sensor is built in the unit, however, optimum white balance adjustment cannot be obtained if the subject and this unit are under different lighting conditions.

P



## 1-9. BACK LIGHT ADJUSTMENT

This unit adjusts the iris automatically. However, when shooting a subject that is backlit, press the BACK LIGHT button.

(The BACK LIGHT Indicator appears when the BACK LIGHT button has been pressed.)

After shooting that particular scene, press the BACK LIGHT button again to release it.

(The BACK LIGHT indicator goes out.)

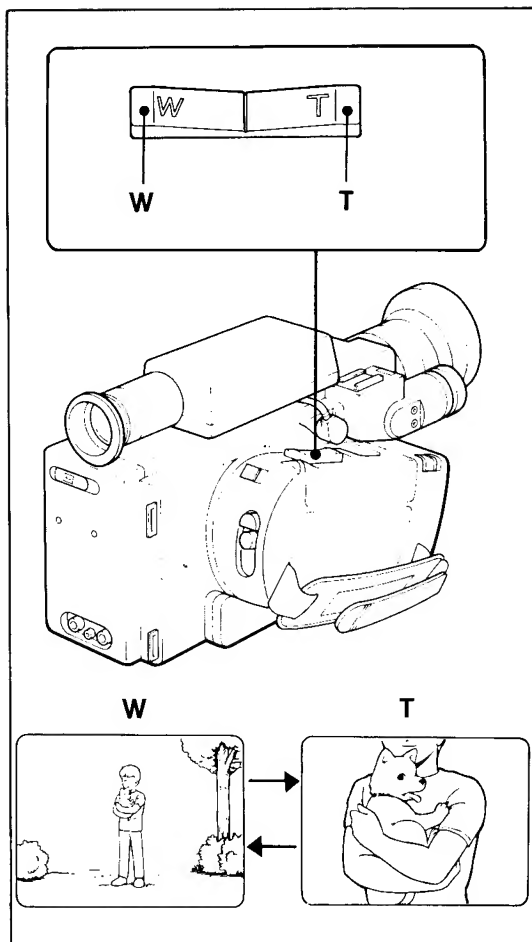
### NOTE

Be sure to release the back light adjustment function when it becomes unnecessary. Otherwise the recorded picture will be too bright.

(The function will be released once the POWER switch is set to OFF.)

## 1-10. ZOOMING

### Q-1



The size of the subject in the scene can be changed.

### POWER ZOOM [Q-1]

—for smooth and constant zooming

Press the T side of the power zoom button for telephoto and the W side for wide-angle. The zoom ring will move automatically.

### MANUAL ZOOM [Q-2]

—to create a dramatic effect

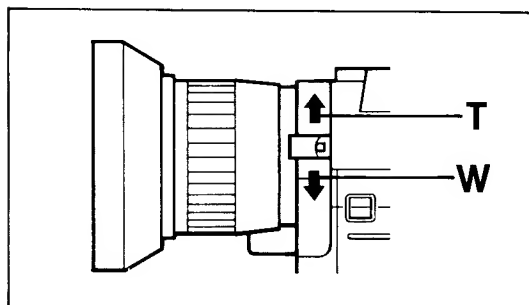
Turn the manual zoom lever upward for telephoto and downward for wide-angle.

#### For more zooming effect

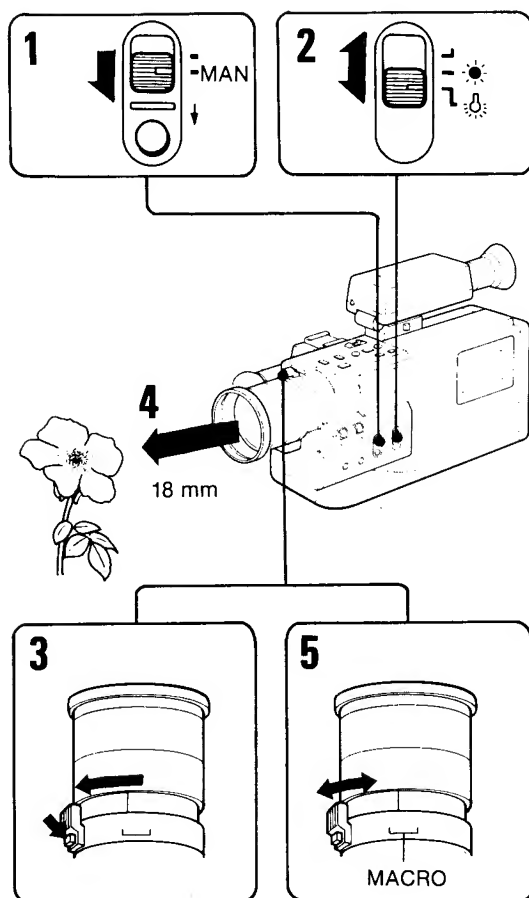
Use an optional conversion lens (VCL-1546A or VCL-0746A).

Auto focus, however, will not function in that case.

### Q-2



**R**



## 1-11. CLOSE-UPS(MACRO)

Even tiny objects can literally fill the screen for dramatic close-up effects.

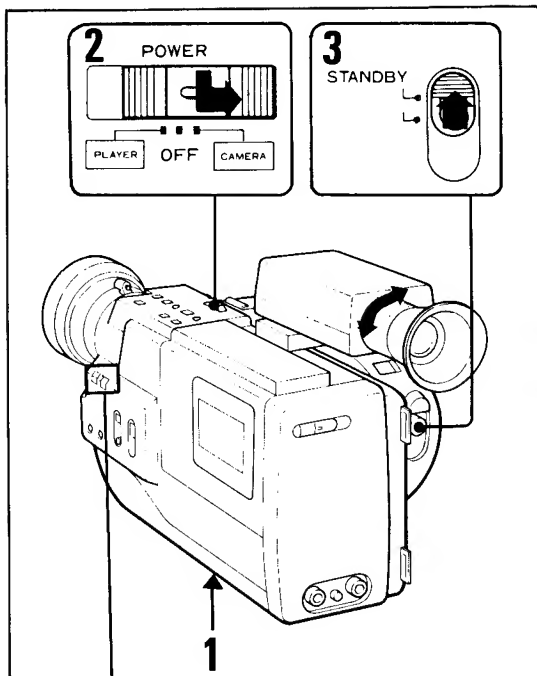
(Remove the lens hood before operation.)

- 1 Set the FOCUS switch to MAN.
- 2 Set the WHITE BAL switch to ☀ or 🌙.
- 3 Turn the zoom lever to the left for MACRO position, holding down the green macro set button.
- 4 Bring the recorder as close as necessary to obtain the desired subject size.  
The subject can be as close as approximately 18 mm (3/4 in.) from the lens surface.
- 5 Turn the zoom lever within the MACRO range to focus sharply.

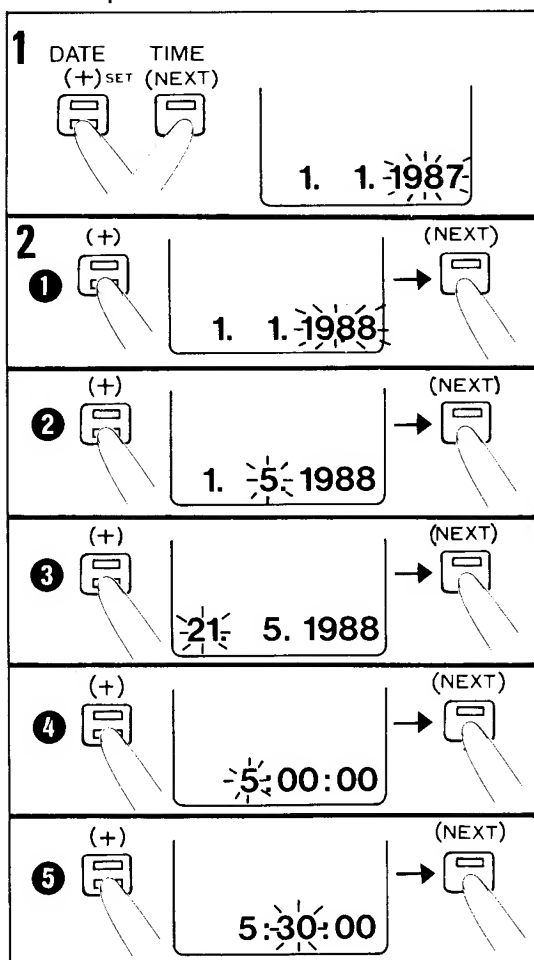
### NOTES

- Auto focusing and linear auto white balance adjustment do not function properly in macro shooting.
- If the subject is closer than 18 mm, it cannot be brought into focus.
- When shooting in macro, the depth of field is very shallow, so pay attention to focus. To keep the subject in focus, use a tripod or monopod.
- Zooming is not possible during macro recording. To change the size of the subject, move the camera recorder closer or further away.

# S-1



# S-2



## 1-12. RECORDING DATE OR TIME

Once the date and the current time are adjusted, the date or time can be recorded together with the picture.

### Before setting the date and time S-1

- 1 Make sure that the lithium battery is installed. See page 11.
- 2 Set the POWER switch to CAMERA.
- 3 Slide up the STANDBY switch to set the unit in the recording pause mode.

## TO SET DATE AND TIME S-2

- 1 Press the DATE and TIME SET buttons simultaneously for more than 3 seconds. The date indication will appear on the viewfinder screen (date/time setting mode). The DATE button now functions as the + button and the TIME button functions as the NEXT button.
- 2 Adjust the year, month, day hour and minute in sequence, following the illustration. First adjust the blinking digits with the + button, and then press the NEXT button.
  - 1 Year
  - 2 Month
  - 3 Day
  - 4 Hour
  - 5 Minute
 After adjusting the minute digits, press the NEXT button at the same time with an announced time signal.

The clock starts operating. There is no need to readjust the date and time as long as the lithium battery remains.

**To clear the time indication from the display**  
Press the TIME SET (NEXT) button again.

### THE + BUTTON CAN BE PRESSED IN TWO WAYS

- When you keep the button pressed, the digits will advance continuously.
- When you press and immediately release the button, the digits will advance by one.

### NOTE

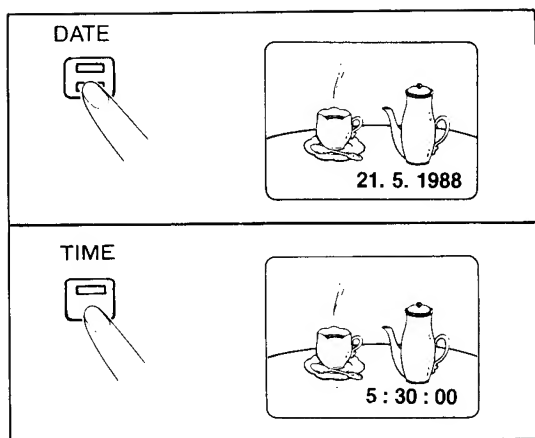
The year indication will return to "1987" when it exceeds "2015".

### To check the preset date and time

Press the DATE or TIME SET button. When the same button is pressed again, the indication goes off.

### To readjust an incorrect date or time

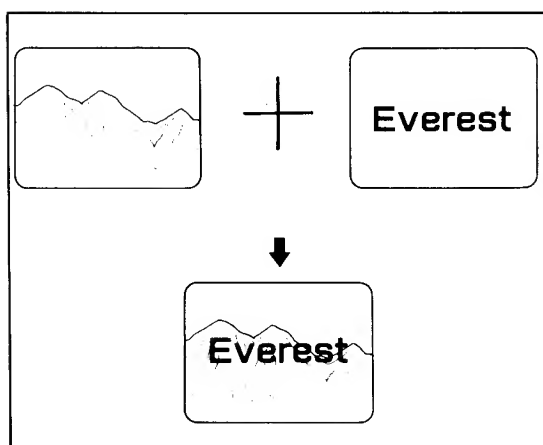
Set the unit to date/time setting mode and press the NEXT button repeatedly until the incorrect digit blinks. Correct it with the + button and press the NEXT button. After adjusting the minute digits, press the NEXT button at the same time with an announced time signal.

**S-3****1-13. TO RECORD THE DATE OR TIME [S-3]****TO RECORD THE DATE OR TIME [S-3]**

During camera recording or in recording pause mode, press the DATE or TIME SET button to display the date or time on the viewfinder screen.

If the unit is set to recording mode, the date or time being displayed will be recorded together with the picture.

To stop recording the date or time, press the DATE or TIME SET button again. The picture recording will continue.

**T****1-14. RECORDING A TITLE**

A title or a figure can be memorized and recorded together with the picture.

The memorized title with a selected colour (8 colours available) is superimposed onto the picture being recorded. **T**

**PREPARATIONS**

The recommended position of the title card is about 212 (8 $\frac{3}{8}$  inches) mm apart from the  $\phi$  mark on the camera.

**To make a desired title card**

Use a white and plane card and draw the title on it with a deep colour (black is recommended for the best result) in thick letters.

**Before memorizing the title**

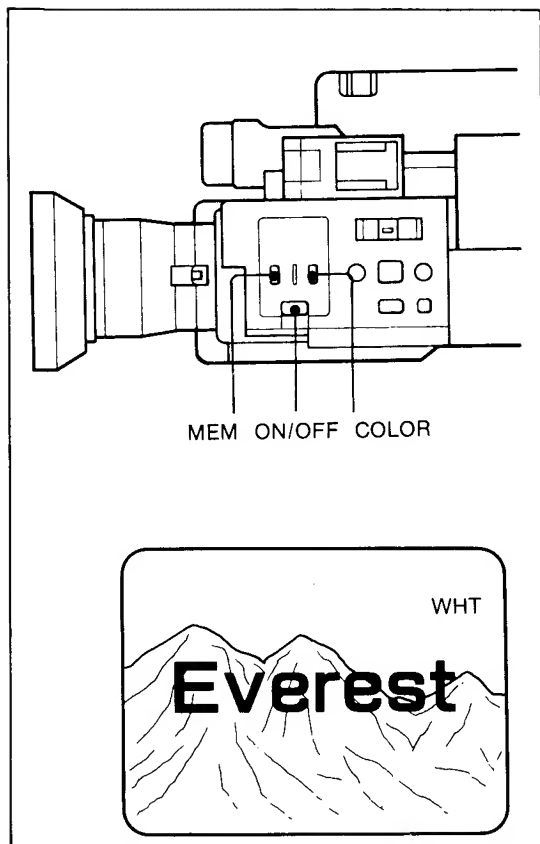
- 1 Make sure that the lithium battery is installed. See page 14.
- 2 Set the POWER switch to CAMERA.
- 3 Slide up the STANDBY switch to set the unit in the recording pause mode.

**NOTE**

The title in the peripheral area of the screen cannot be memorized. Especially, when a white title with the black background covering the entire screen is memorized, a white frame may appear.

When deciding the title size, check the effective picture size on your video monitor.

**U**



### TO MEMORIZE THE TITLE **U**

- 1 Set the zoom lever to the MACRO position. Point the camera to the title card and adjust the focus.
- 2 Press the MEM button to memorize the title.
- 3 Select the title colour while observing the colour indication in the viewfinder. Each push on the COLOR button cyclically changes the colour, as follows:

WHT (white) → BLUE → GRN (green) → CYAN  
↑ ↓  
BLK (black) ← YEL (yellow) ← VIO (violet) ← RED

- 4 Press the SUPERIMPOSE ON/OFF button to turn off the title.

#### NOTES

- The colour indication in the viewfinder is not recorded on the tapes.
- You can change the title colour even after starting the recording.
- To memorize a title, use of an appropriate light is recommended for a better result.

#### To check the title

To check the memorized title, press the SUPERIMPOSE ON/OFF button. To turn off the title, press the button again.

### TO RECORD THE TITLE

During camera recording, press the SUPERIMPOSE ON/OFF button at the point from which the title is to be inserted. The memorized title will be recorded together with the picture.

#### To record the title from the beginning

Before starting the recording, press the SUPERIMPOSE ON/OFF button.

**To stop recording the title**, press the SUPERIMPOSE ON/OFF button again. The picture recording will continue.

#### For recording the title several times

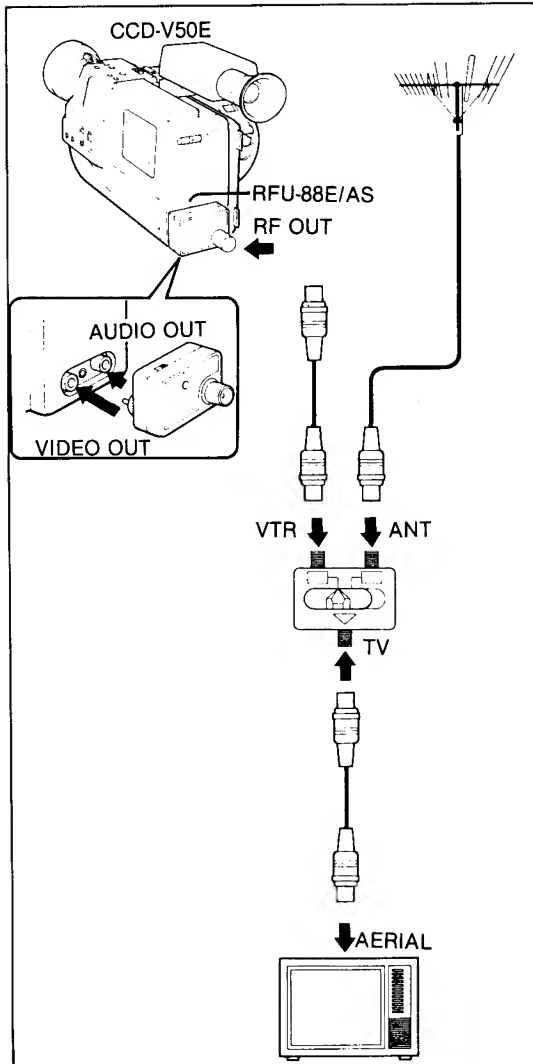
By repeating the above procedure, you can record the title as many times as desired.



## 1-15. PREPARATION FOR PLAYBACK

### —connecting a TV set

#### W-1



#### [1] Connecting a TV without audio/video input jacks **W-1**

Connect the RFU-88E/AS RFU adaptor to the CCD-V50E.

- 1 Connect the aerial, RFU-88E/AS, and TV to the aerial selector (supplied with the RFU-88E/AS) using the supplied 75-ohm coaxial cables.
- 2 Set the I/G selector on the RFU-88E according to the TV system of your country.
- 3 Adjust one of the TV programme position to receive the signal from the video camera recorder. See "Adjusting the TV" below.
- 4 Set the selector switch on the aerial selector to VTR for viewing a playback picture.
- 5 Select the same channel on the TV as that selected in adjusting the TV.

#### Adjusting the TV with the RFU-88E

- 1 Turn on the TV and select a programme position which is not being used to receive a TV station.
- 2 Set the POWER switch of the CCD-V50E to CAMERA and slide the STANDBY switch up.
- 3 Set the selector switch of the aerial selector to VTR.
- 4 Tune the TV until you see the picture and hear the sound from the CCD-V50E.

#### If the playback picture is not free of disturbance

- 1 Set the selector switch of the aerial selector to ANT.
- 2 Adjust the programme position of the TV to a channel between UHF channels 30 and 39 with the tuning control or the fine tuning control on the TV, so that the TV screen shows no picture and so that a steady rustling sound or no sound is heard.
- 3 Set the selector switch of the aerial selector to VTR.
- 4 Slowly turn the RF channel screw of the RFU-88E with the supplied screwdriver, until the picture from the CCD-V50E becomes clear.

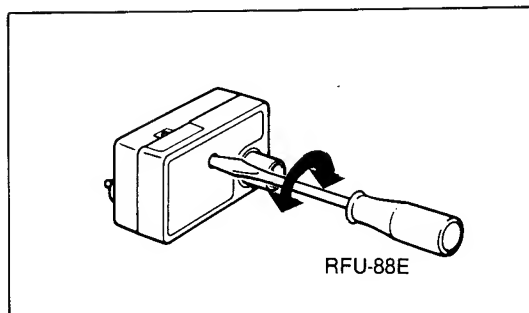
**W-2**

Now the TV adjustment is complete.

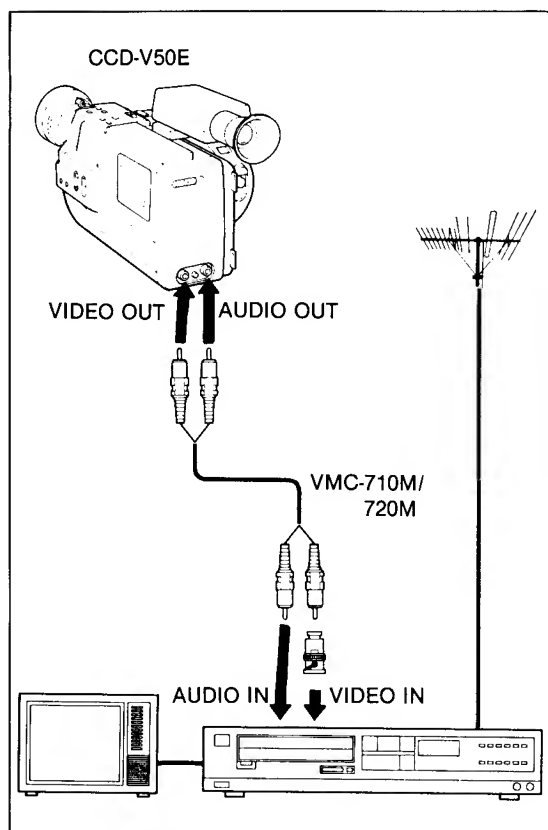
#### Adjusting the TV with the RFU-88AS

Select the CHANNEL selector on the RFU-88AS to 0 CH or 1 CH, whichever is not active in your area, and select the same channel on the TV.

#### W-2



**W-3**



**[2] Connecting a TV connected to another VTR with an input selector** **W-3**  
Use the optional connecting cord VMC-710M/720M.

Set the selectors on the VTR as follows:

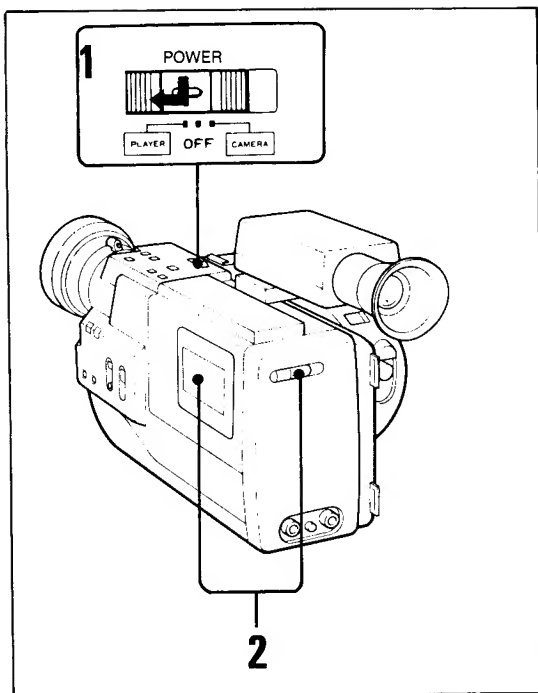
Input selector → LINE

TV/VTR selector → VTR

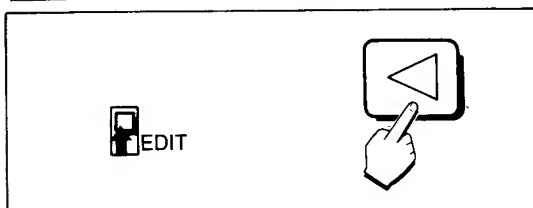
**NOTE**

When the VTR to be connected has stereo audio inputs, use the optional VMC-910MS/920MS connecting cord.

**X-1**



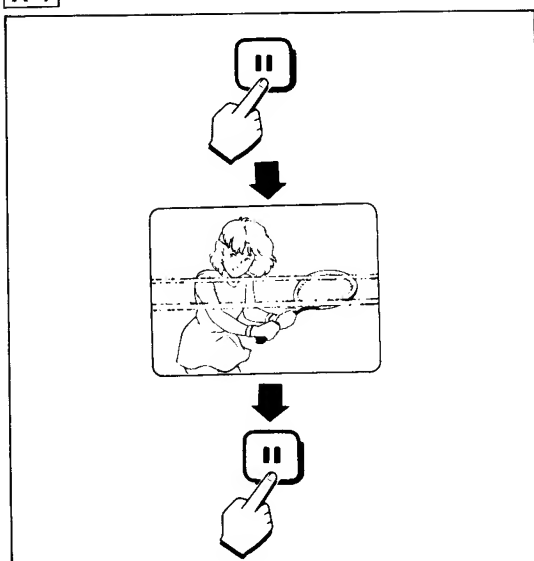
**X-2**



**X-3**



**X-4**



## 1-16. PLAYBACK

Turn on the TV (or colour monitor), and select the channel for viewing a playback picture (or set the TV/VIDEO selector to VIDEO).

- 1 Set the POWER switch to PLAYER, and insert a cassette. **X-1**
- 2 Set the REC MODE/EDIT switch in the upper position. **X-2**  
The unit detects the recorded mode of the tape, and adjust the tape speed automatically.
- 3 Press the ◀ button. **X-3**  
Playback will start.

**To stop the tape**, press the ■ button.

**After using**, be sure to set the POWER switch of the recorder to OFF.

**To get a still picture** **X-4**

Press the || button during playback. To resume playback, press the || button again or press the ◀ button.

## MONITORING A HIGH-SPEED PICTURE

— To skip over or repeat a certain portion

- 1 In the playback mode, press the ◀◀ or ▶▶ button.  
The picture will be monitored at high speed as long as it is kept pressed.
- 2 Release the ◀◀ or ▶▶ button at the desired point.  
Normal playback will resume.

### NOTES

- If you move the position of the POWER switch during playback, the tape will stop. When you move the POWER switch to CAMERA in the playback pause mode, however, the unit will enter recording pause mode.
- When the pause mode lasts for 7 minutes or more, the unit will automatically enter the stop mode.
- Streaks will appear and the sound will be muted in the still picture and the high-speed picture.
- When a tape is recorded in SP mode, a still picture and high-speed picture may be noisy with many streaks and become black and white. Streaks will be wider than those of an LP-recorded tape.

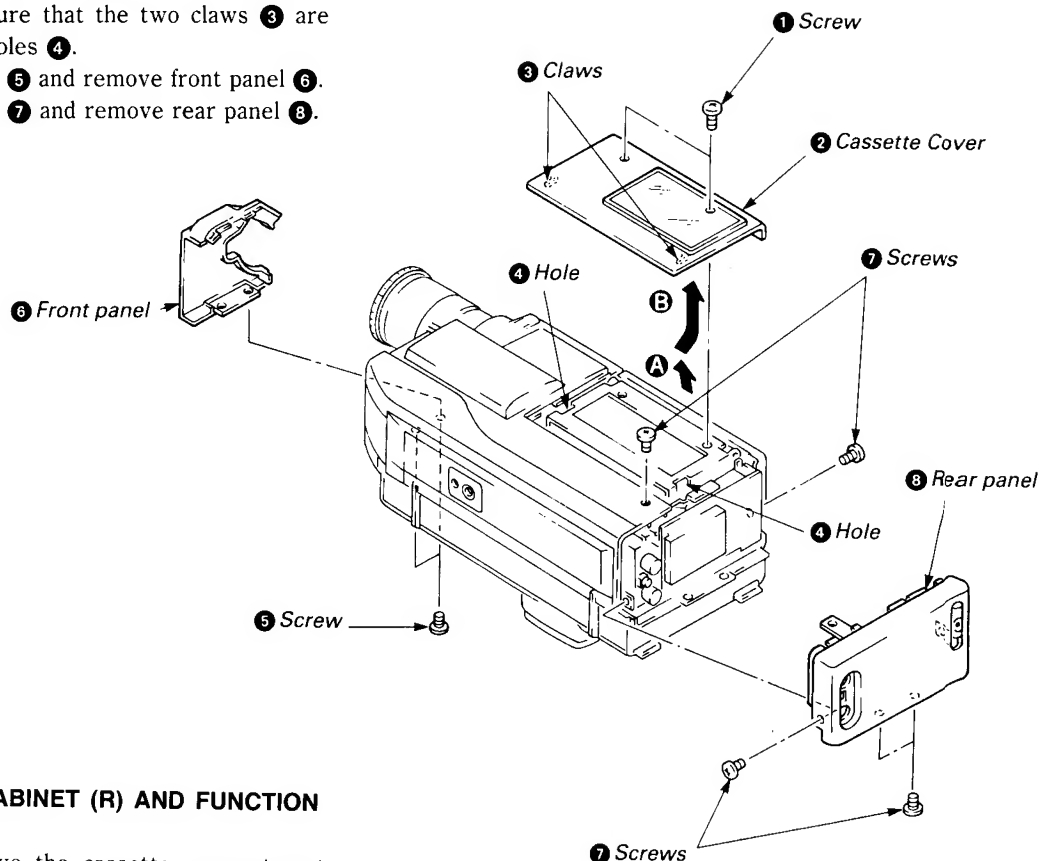
## SECTION 2 DISASSEMBLY

### 2-1. REMOVAL OF THE FRONT AND REAR PANELS OF THE CASSETTE COMPARTMENT

- 1) Remove the two screws ①.
- 2) Lift cassette cover ② in the direction of arrow A and remove in the direction of arrow B.

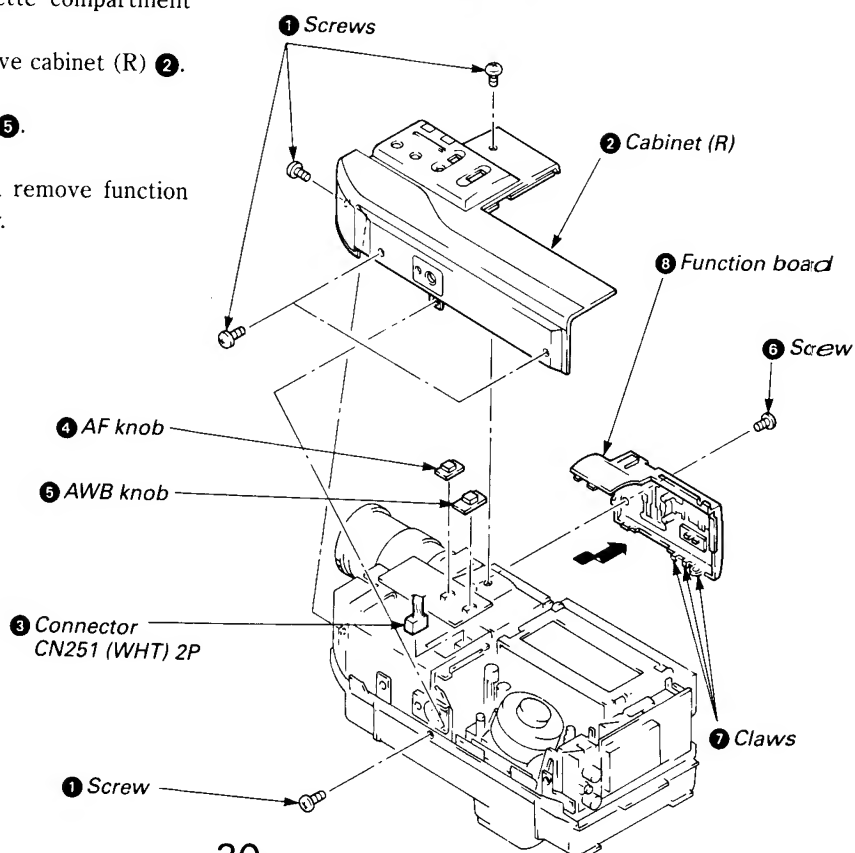
**Note:** When mounting, ensure that the two claws ③ are inserted in the two holes ④.

- 3) Remove the two screws ⑤ and remove front panel ⑥.
- 4) Remove the five screws ⑦ and remove rear panel ⑧.



### 2-2. REMOVAL OF THE CABINET (R) AND FUNCTION BOARD

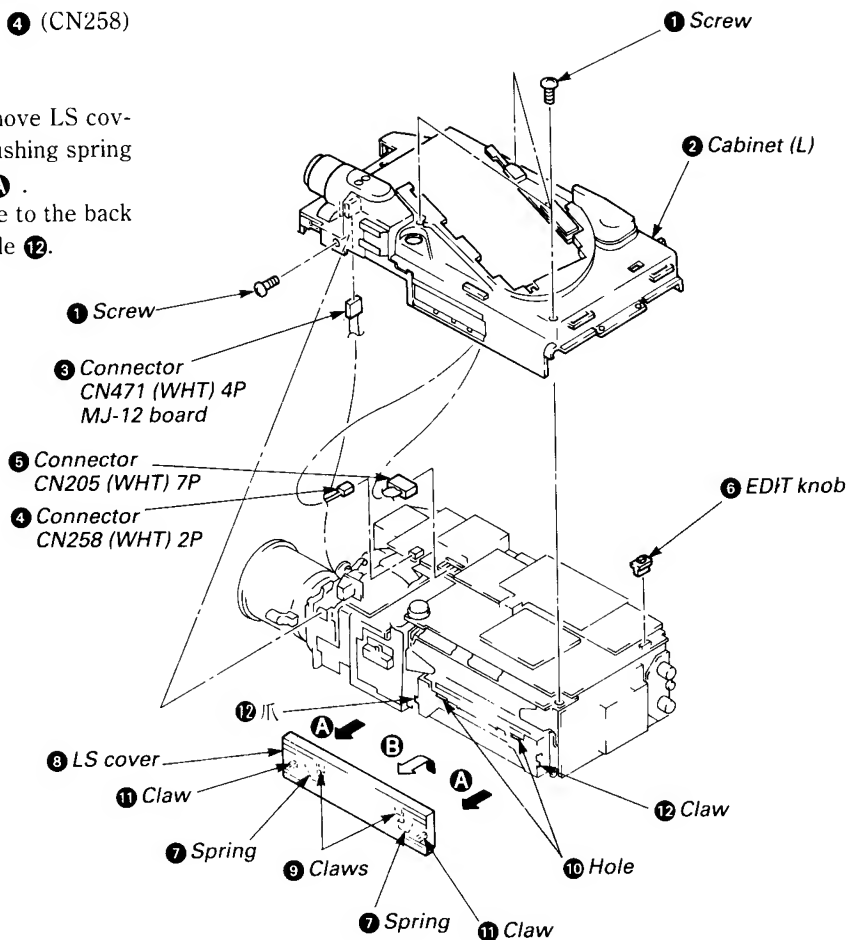
- 1) Refer to 2-1 and remove the cassette compartment cover, front panel and rear panel.
- 2) Remove the five screws ① and remove cabinet (R) ②.
- 3) Remove connector ③ (CN251).
- 4) Remove AF knob ④ and AWB knob ⑤.
- 5) Remove screw ⑥.
- 6) Remove claw ⑦ in three places and remove function board ⑧ in the direction of the arrow.



### 2-3. REMOVAL OF THE CABINET (L) AND LS COVER

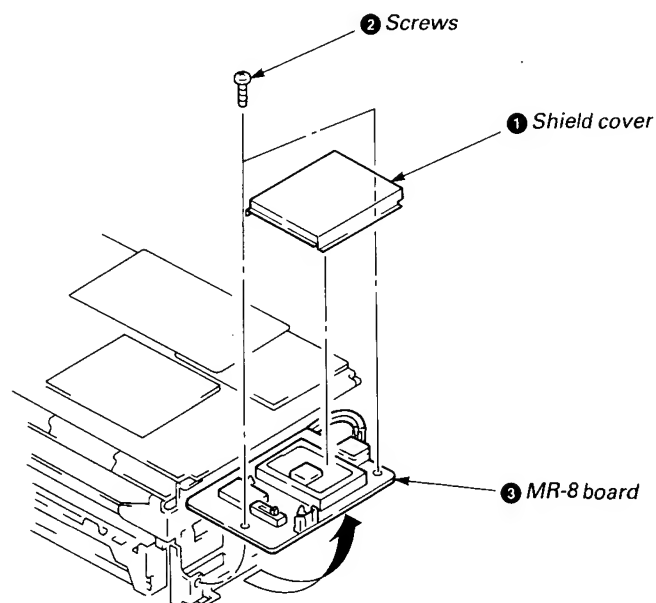
- 1) Remove cabinet (R) and the function board according to 2-2.
- 2) Remove four screws ① and cabinet (L) ②.
- 3) Remove connector ③ (CN471), connector ④ (CN258) and connector ⑤ (CN205).
- 4) Remove EDIT knob ⑥.
- 5) Insert a slim standard screwdriver and remove LS cover ⑧ in the direction of arrow B while pushing spring ⑦ (two places) in the direction of arrow A.

**Note:** When mounting, set so claw ⑨ will come to the back of hole ⑩ and claw ⑪ to the back of hole ⑫.



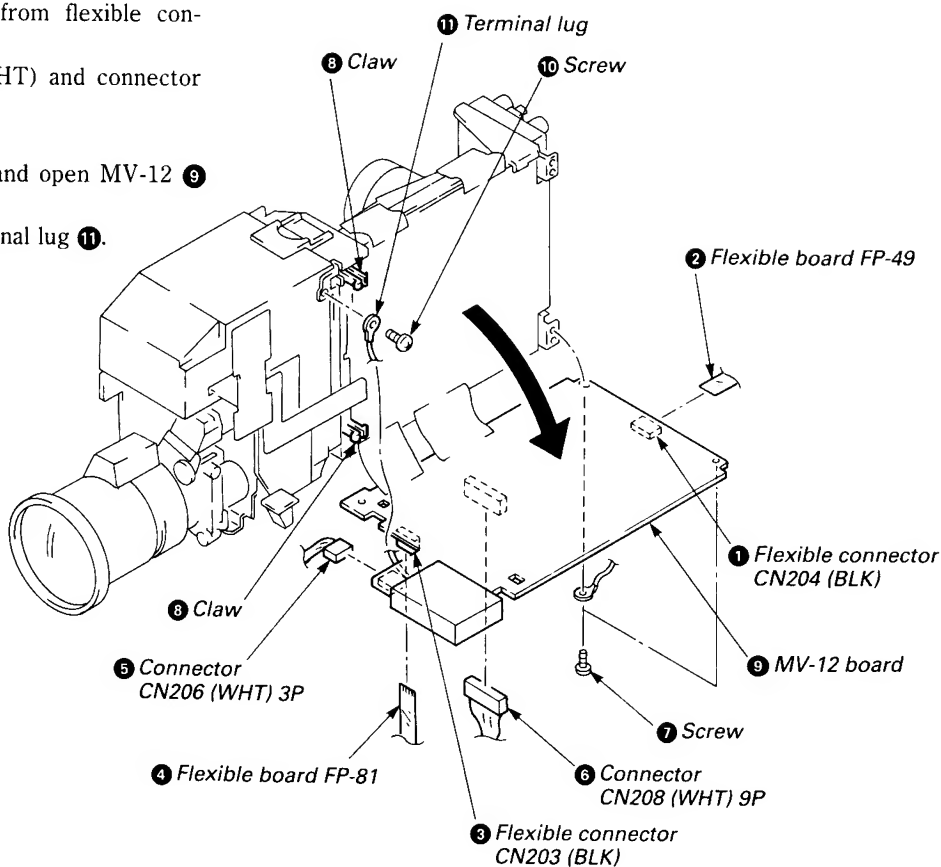
### 2-4. OPENING THE MR-8 BOARD

- 1) Remove shield cover ①.
- 2) Remove screw ② (two places) and remove MR-8 board ③ in the direction of the arrow.



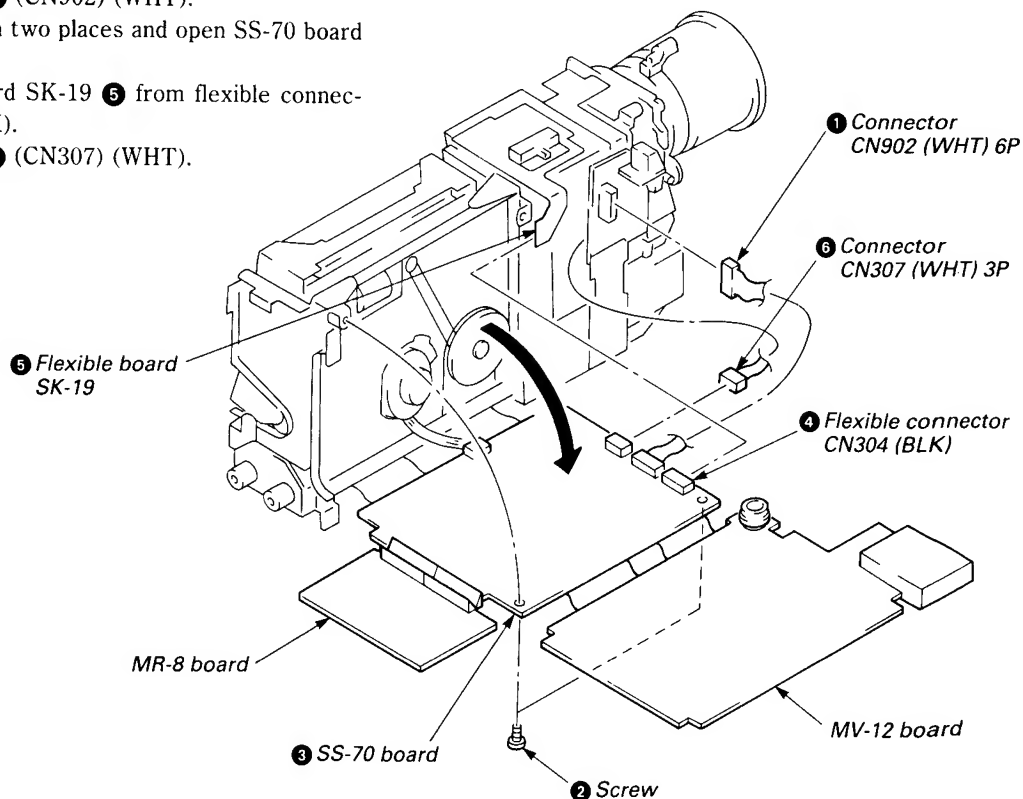
## 2-5. OPENING THE MV-12 BOARD

- 1) Remove flexible board FP-49 **2** from flexible connector **1** (CN204) (BLK).
- 2) Remove flexible board FP-81 **4** from flexible connector **3** (CN203) (BLK).
- 3) Remove connector **5** (CN206) (WHT) and connector **6** (CN208) (WHT).
- 4) Remove two screws **7**.
- 5) Remove Claw **8** from two places and open MV-12 **9** Board.
- 6) Remove screw **10** and remove terminal lug **11**.



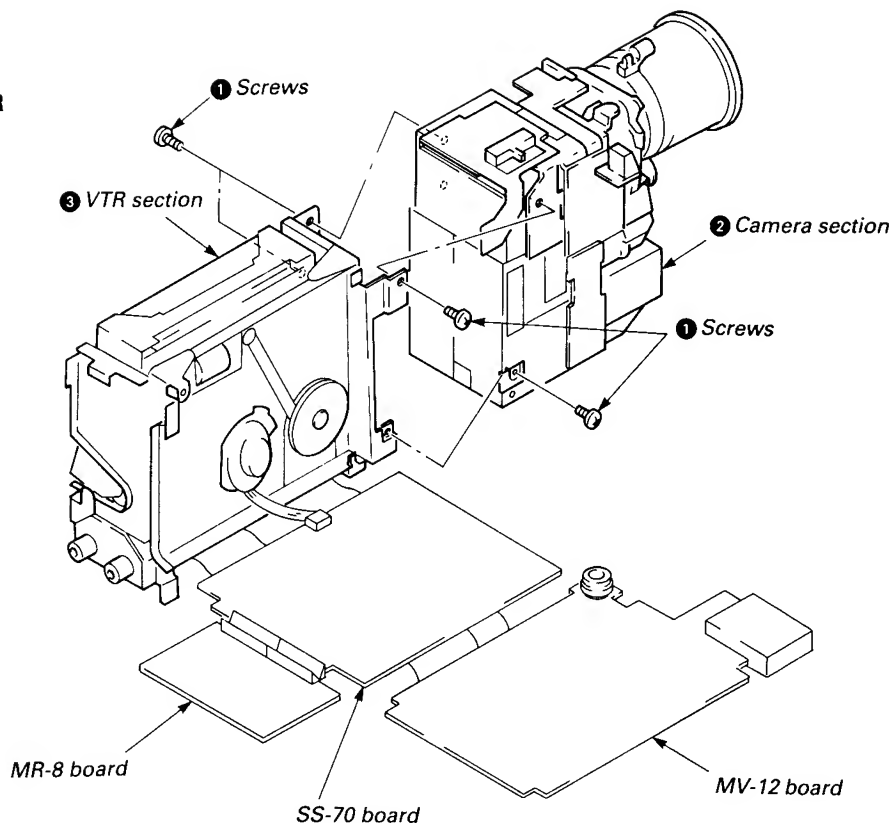
## 2-6. OPENING THE SS-70 BOARD

- 1) Open MR-8 board according to 2-4.
- 2) Open MV-12 Board according to 2-5.
- 3) Remove connector **1** (CN902) (WHT).
- 4) Remove screws **2** in two places and open SS-70 board **3**.
- 5) Remove flexible board SK-19 **5** from flexible connector **4** (CN304) (BLK).
- 6) Remove connector **6** (CN307) (WHT).



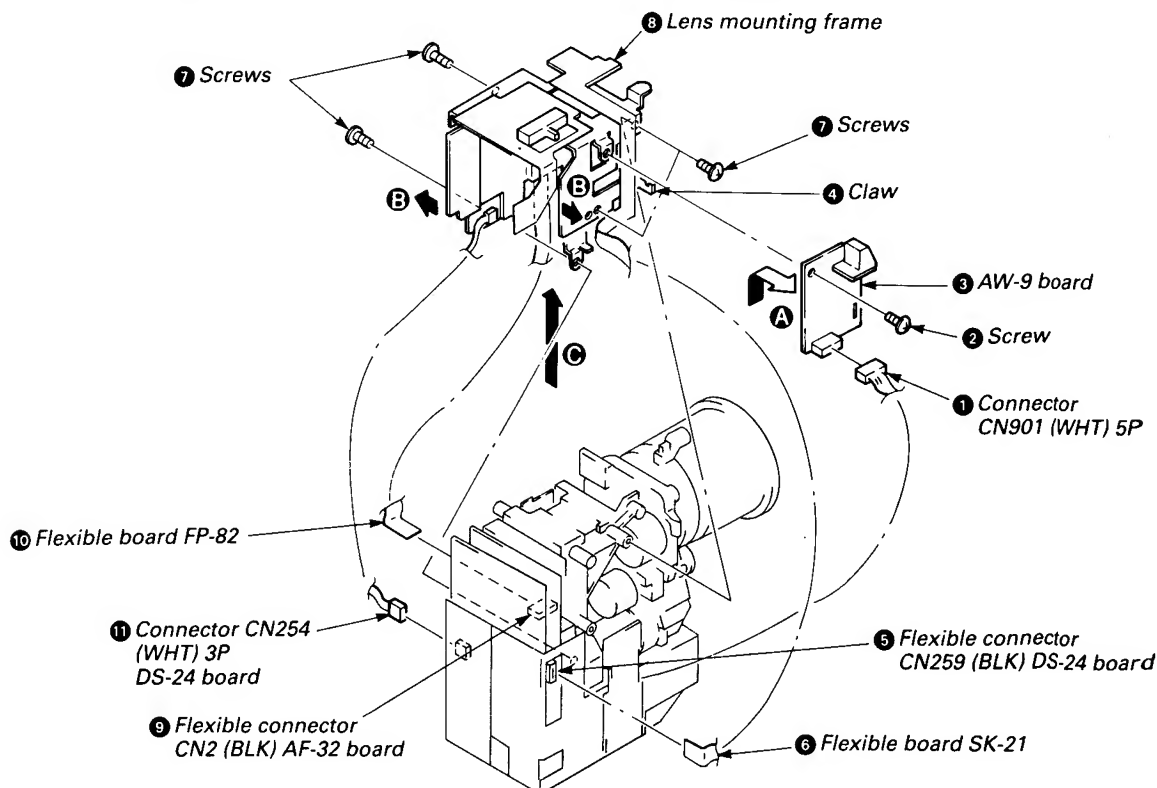
## 2-7. SEPARATING THE CAMERA AND VTR SECTIONS

- 1) Open the SS-70 board according to 2-6.
- 2) Remove the four screws ①.
- 3) Separate the camera section ② and the VTR section ③.



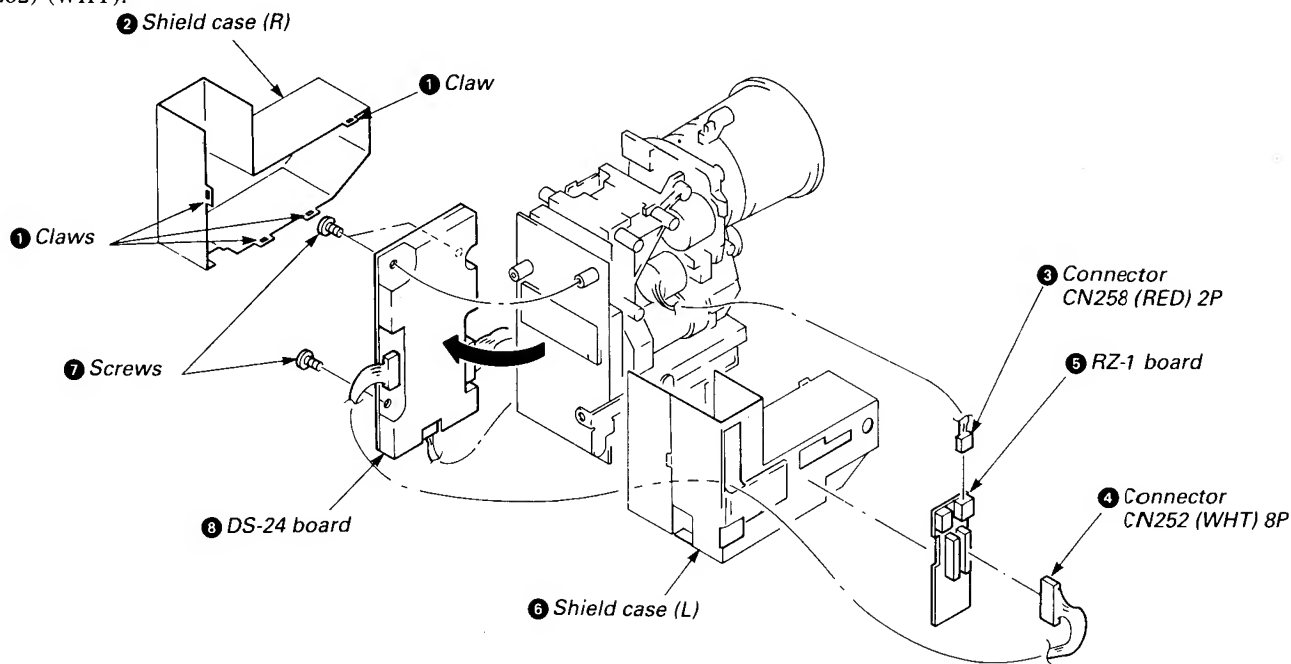
## 2-8. REMOVAL OF THE AW-9 BOARD AND THE LENS MOUNTING FRAME

- 1) Separate the camera and VTR sections according to 2-7.
- 2) Remove connector ① (CN901) (WHT).
- 3) Remove screw ② and remove AW-9 board ③ in the direction of arrow A while being careful of claw ④.
- 4) Remove flexible board SK-21 ⑥ from flexible connector ⑤ (CN259) (BLK).
- 5) Remove the four screws ⑦.
- 6) Remove lens mounting frame ⑧ by spreading both sides in the direction of arrow B and pulling in the direction of arrow C.
- 7) Remove flexible board FP-82 ⑩ from flexible connector ⑨ (CN2) (BLK).
- 8) Remove connector ⑪ (CN254) (WHT).



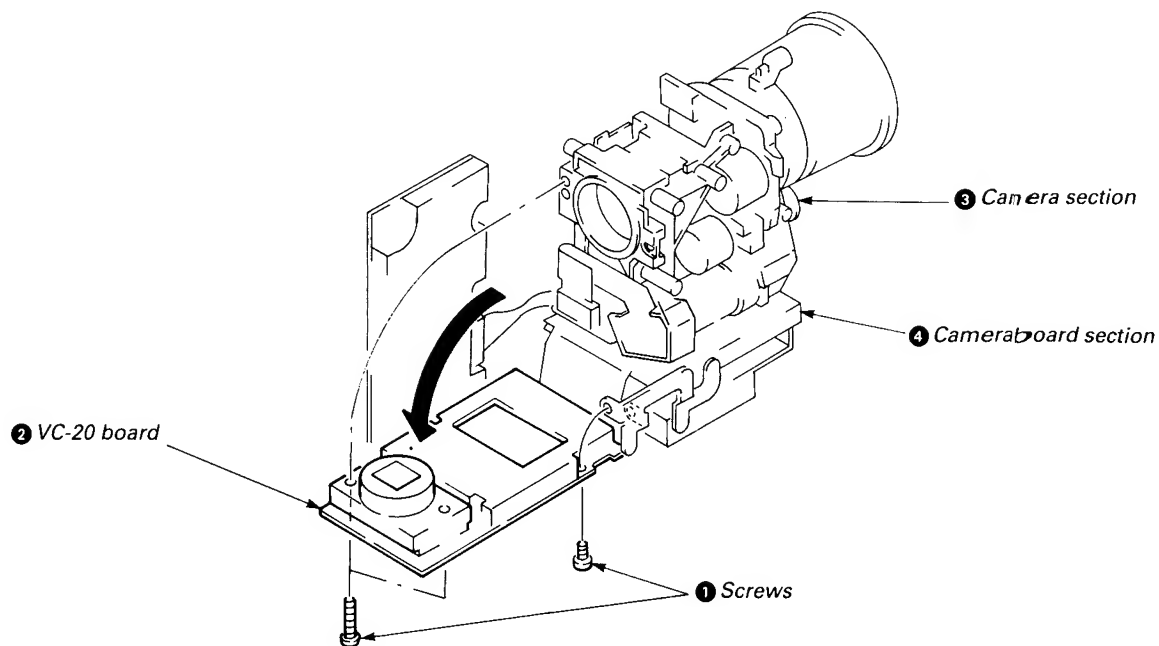
## 2-9. OPENING THE DS-24 BOARD

- 1) Remove the lens mounting frame according to 2-8.
- 2) Remove claw ① in four places and remove shield case (R) ②.
- 3) Remove connector ③ (CN258) (RED) and connector ④ (CN252) (WHT).
- 4) Remove RZ-1 Board ⑤.
- 5) Remove shield case (L) ⑥.
- 6) Remove three screws ⑦ and open DS-24 board ⑧.



## 2-10. OPENING THE VC-20 BOARD

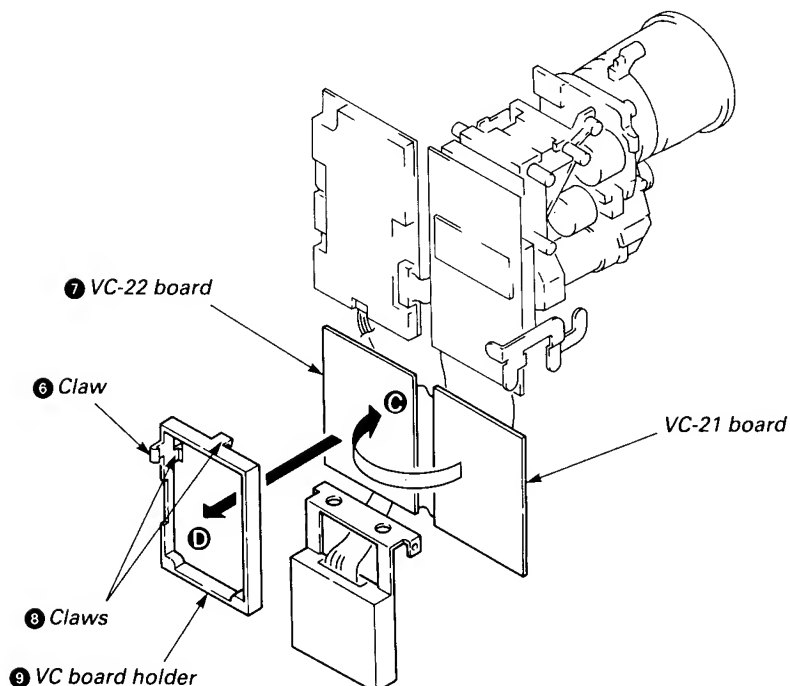
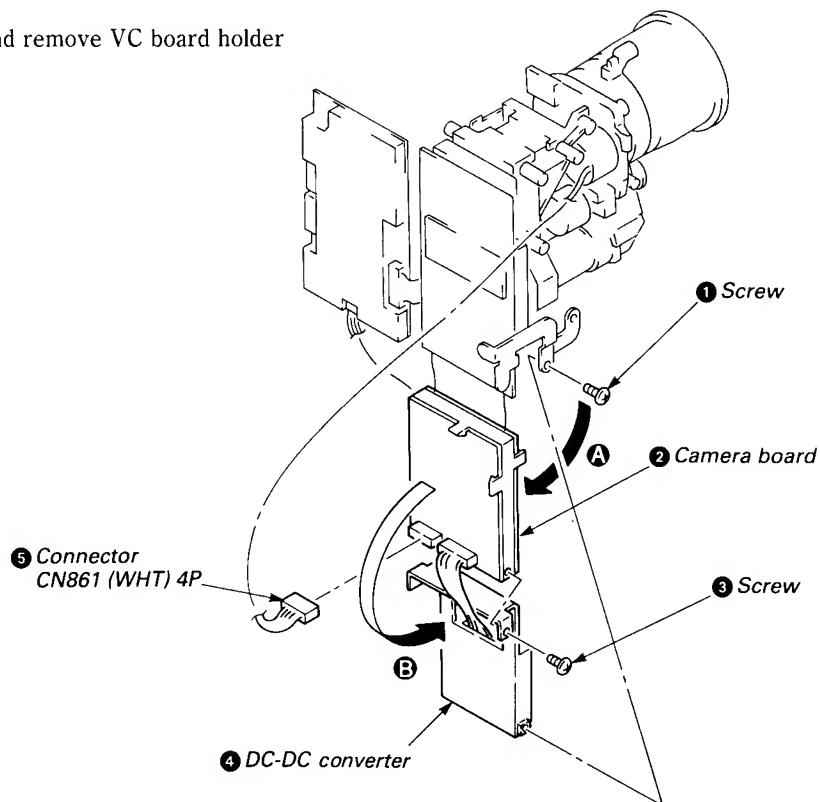
- 1) Open DS-24 board according to 2-9.
  - 2) Remove three screws ① and open VC-20 board ②.
- Note:** When VC-20 board ② is opened, camera section ③ and camera board assembly section ④ will come apart.





## 2-11. OPENING THE CAMERA BOARD

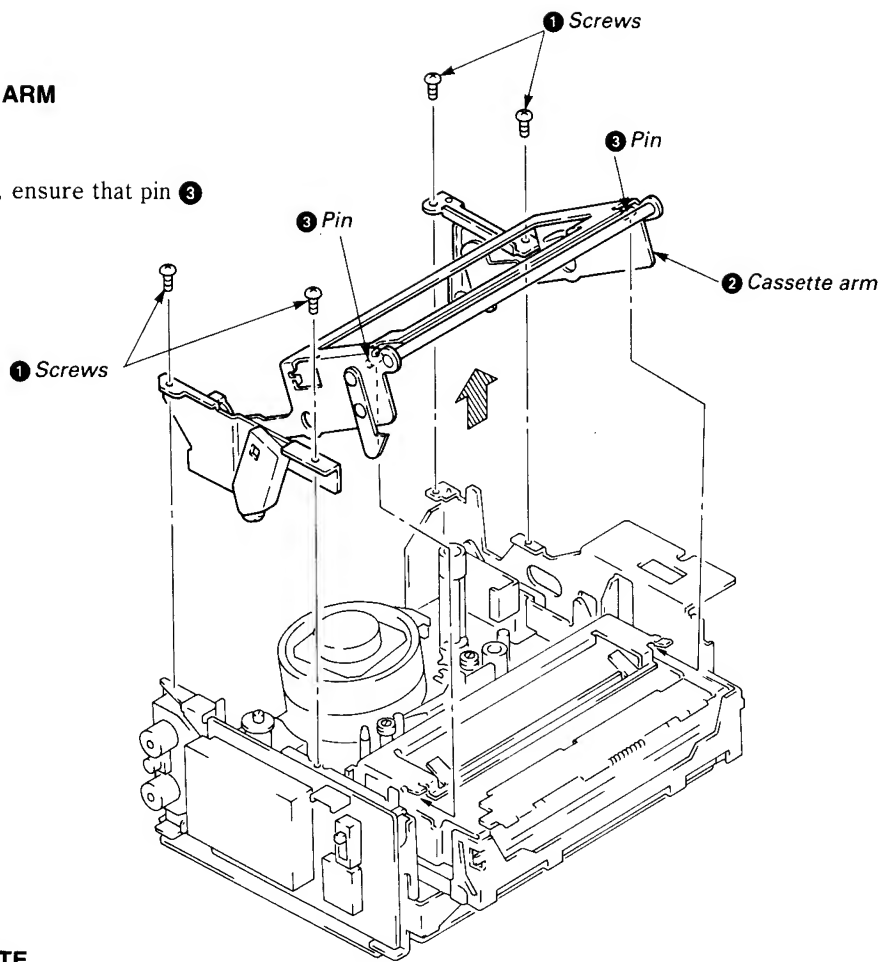
- 1) Open DS-24 board according to 2-9.
- 2) Remove screw ① and open camera board ② in the direction of arrow A .
- 3) Remove screw ③ and open DC-DC converter ④ in the direction of arrow B .
- 4) Remove connector ⑤ (CN861) (WHT).
- 5) Remove claw ⑥ and open VC-22 board ⑦ in the direction of arrow C .
- 6) Remove the two claws ⑧ and remove VC board holder ⑨.



## 2-12. REMOVAL OF THE CASSETTE ARM

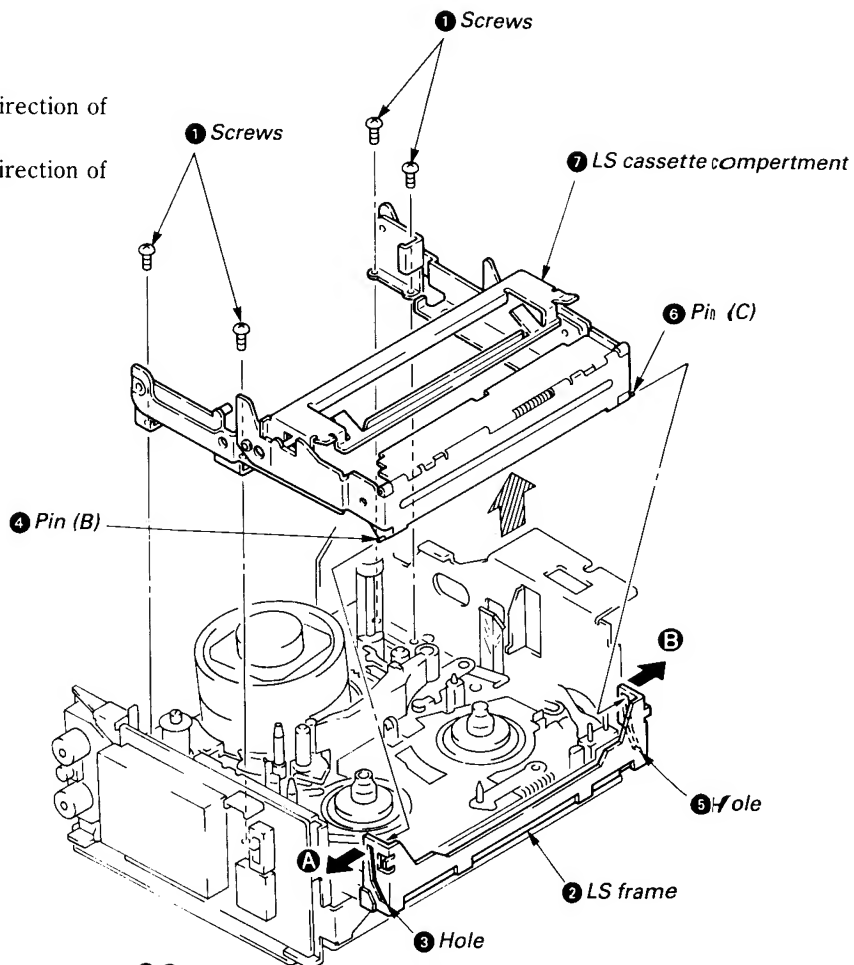
- 1) Remove the four screws ①.
- 2) Remove cassette arm ②.

**Note:** When mounting cassette arm ②, ensure that pin ③ is in its prescribed position.

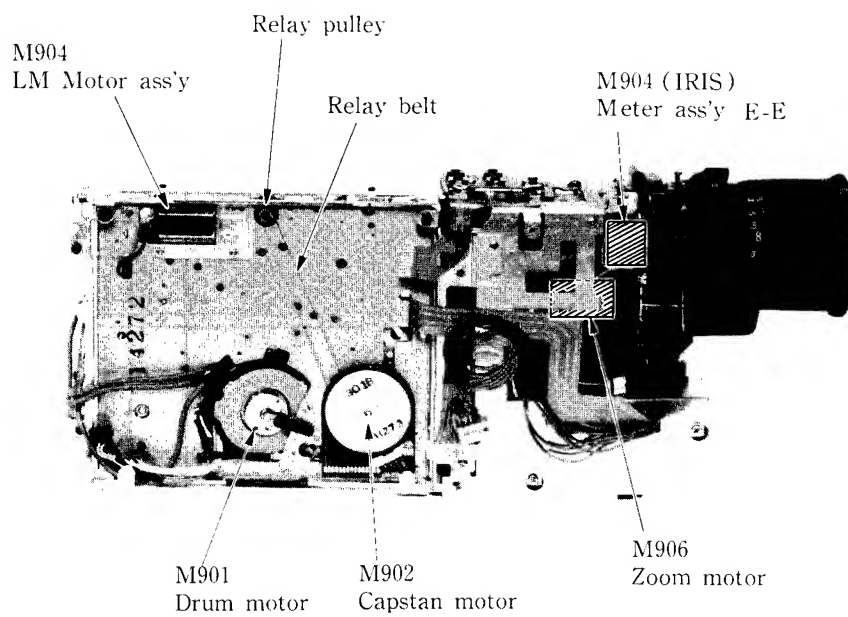
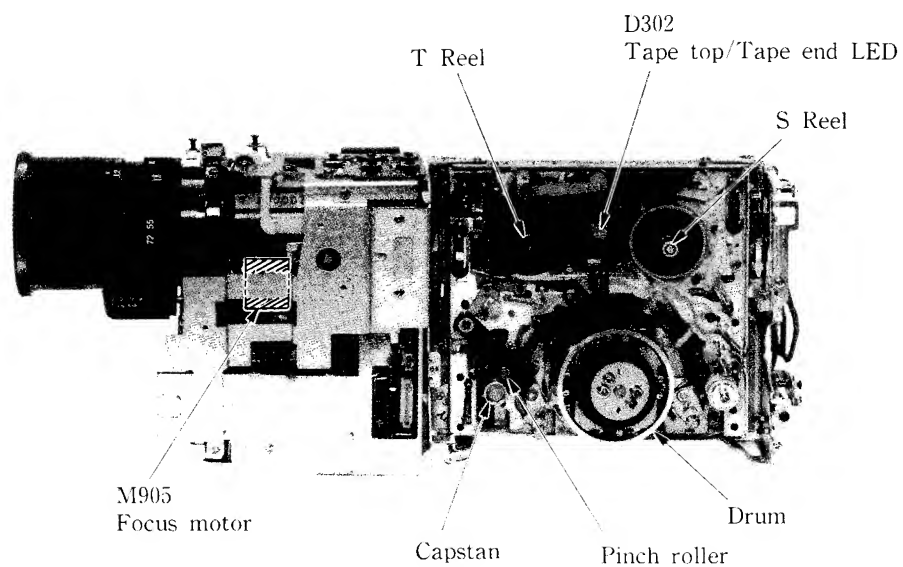


## 2-13. REMOVAL OF THE LS CASSETTE COMPARTMENT

- 1) Remove the cassette arm according to 2-12.
- 2) Remove the four screws ①.
- 3) Bend hole ③ of LS frame ② slightly in the direction of arrow A and remove pin (B) ④.
- 4) Bend hole ⑤ of LS frame ② slightly in the direction of arrow B and remove pin (C) ⑥.
- 5) Remove LS cassette compartment ⑦.

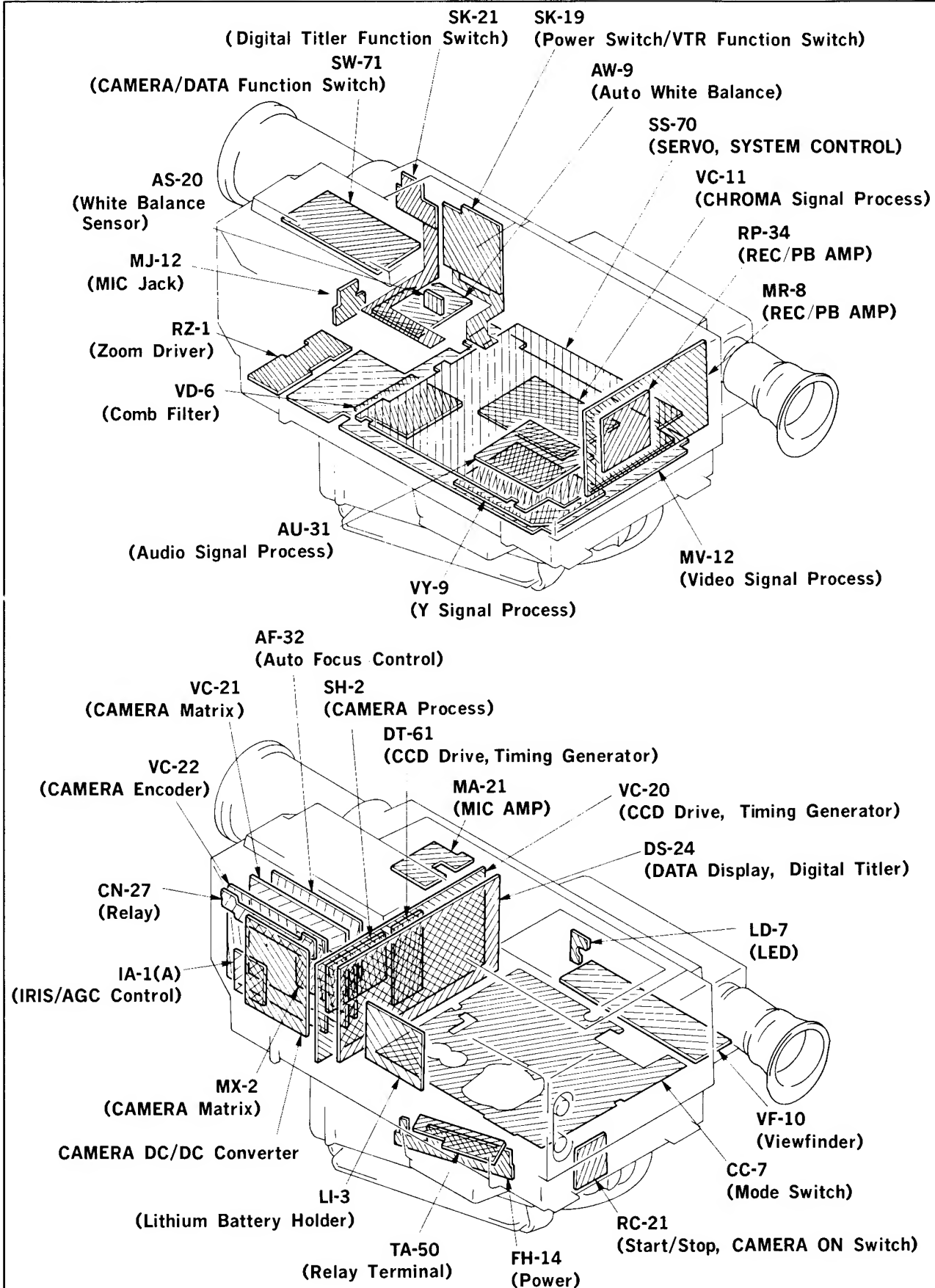


## 2-14. INTERNAL VIEWS

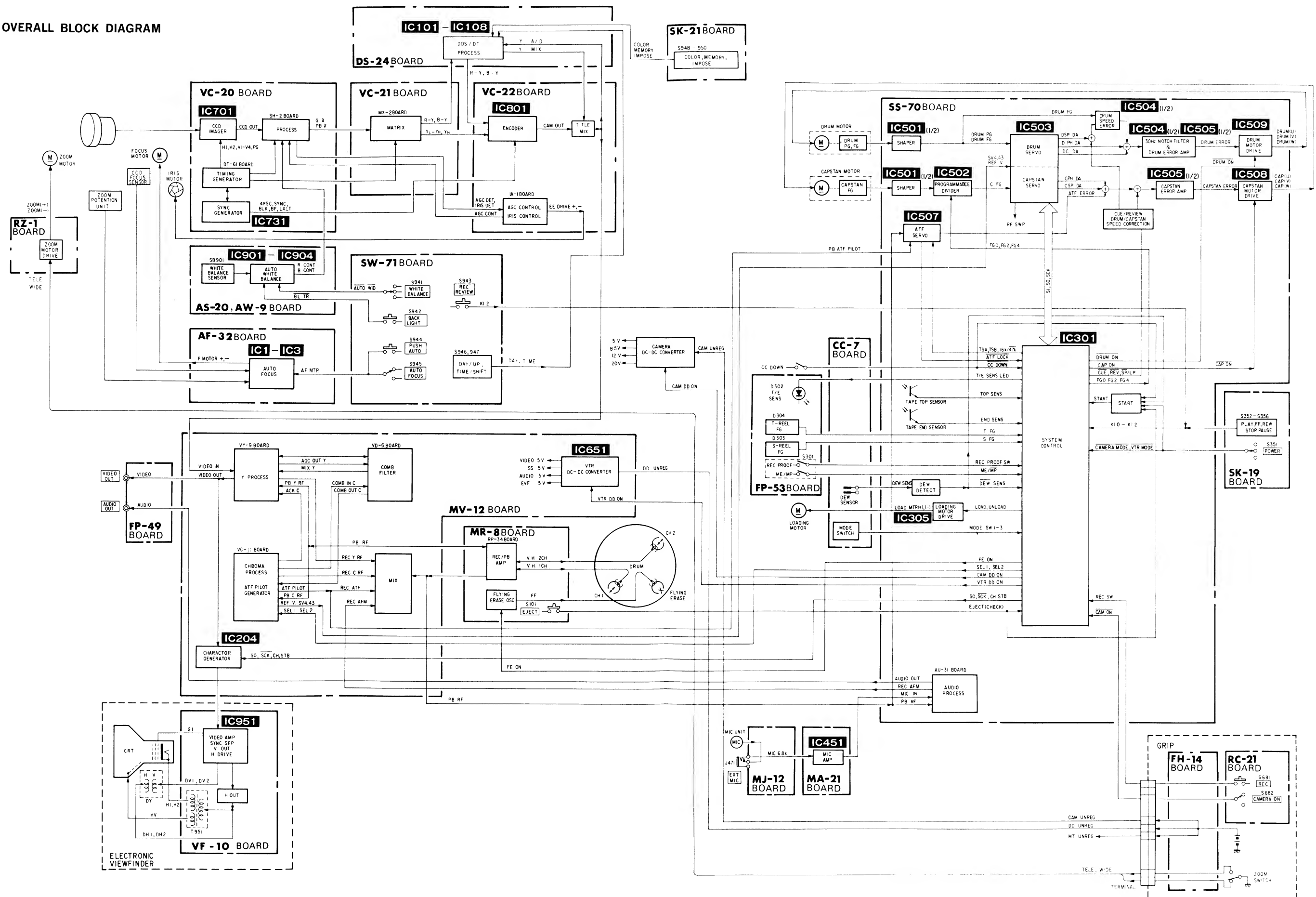


## SECTION 3 DIAGRAMS

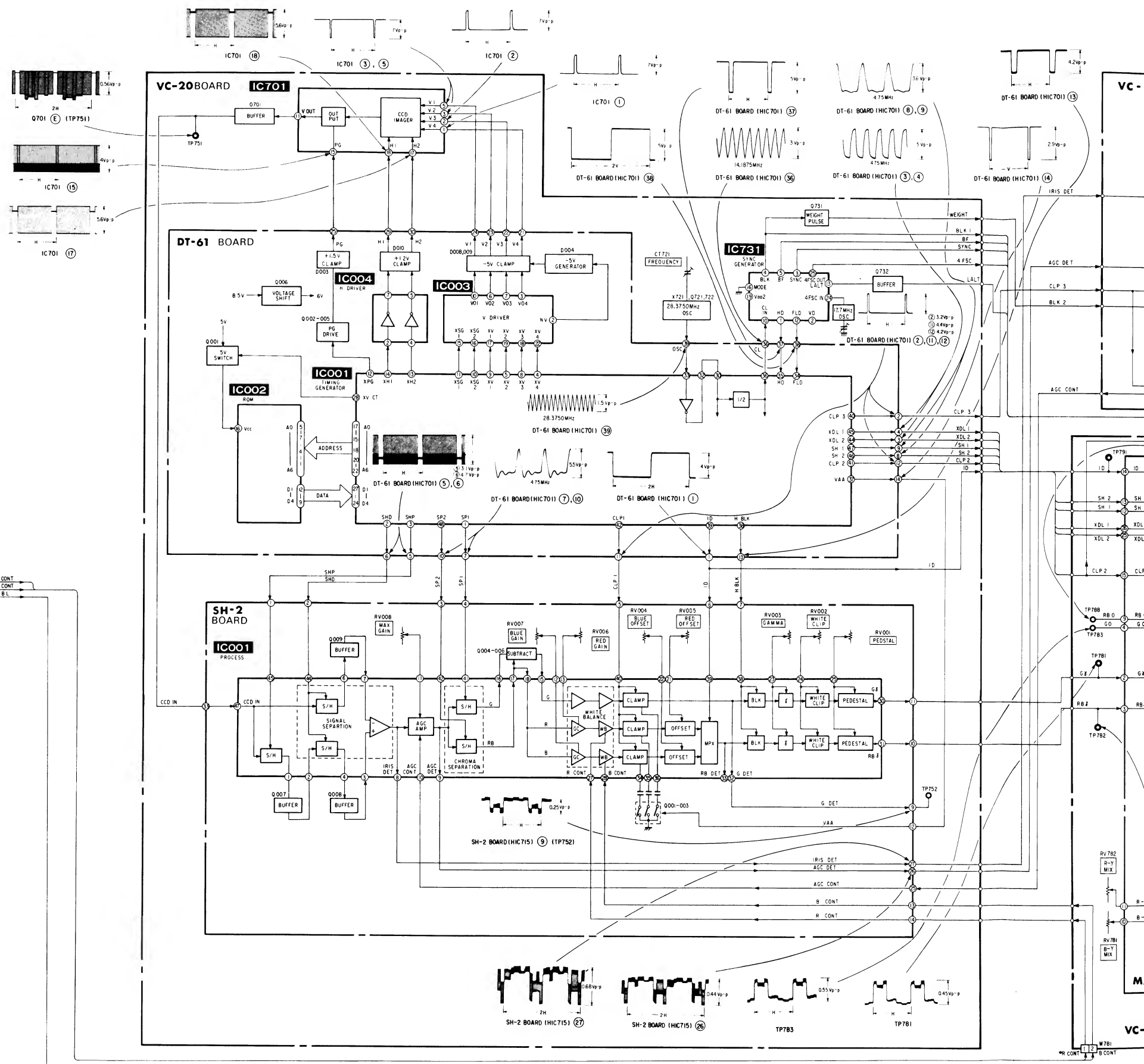
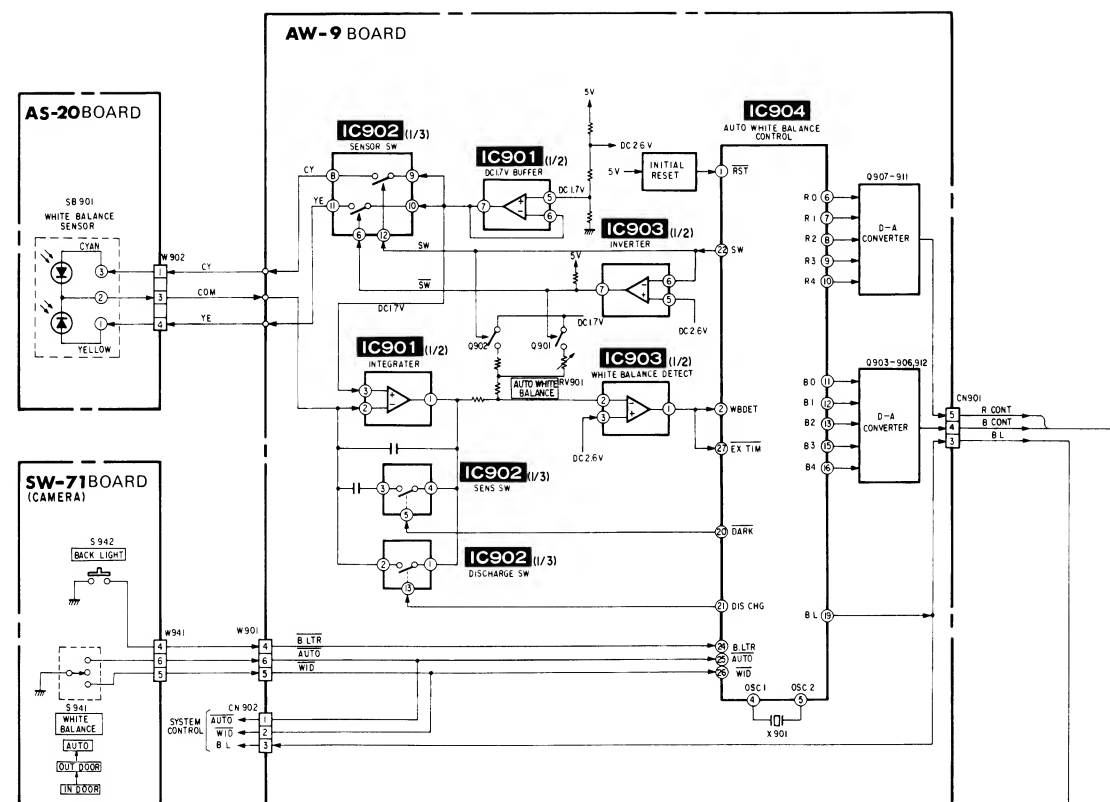
### 3-1. CIRCUIT BOARDS LOCATION

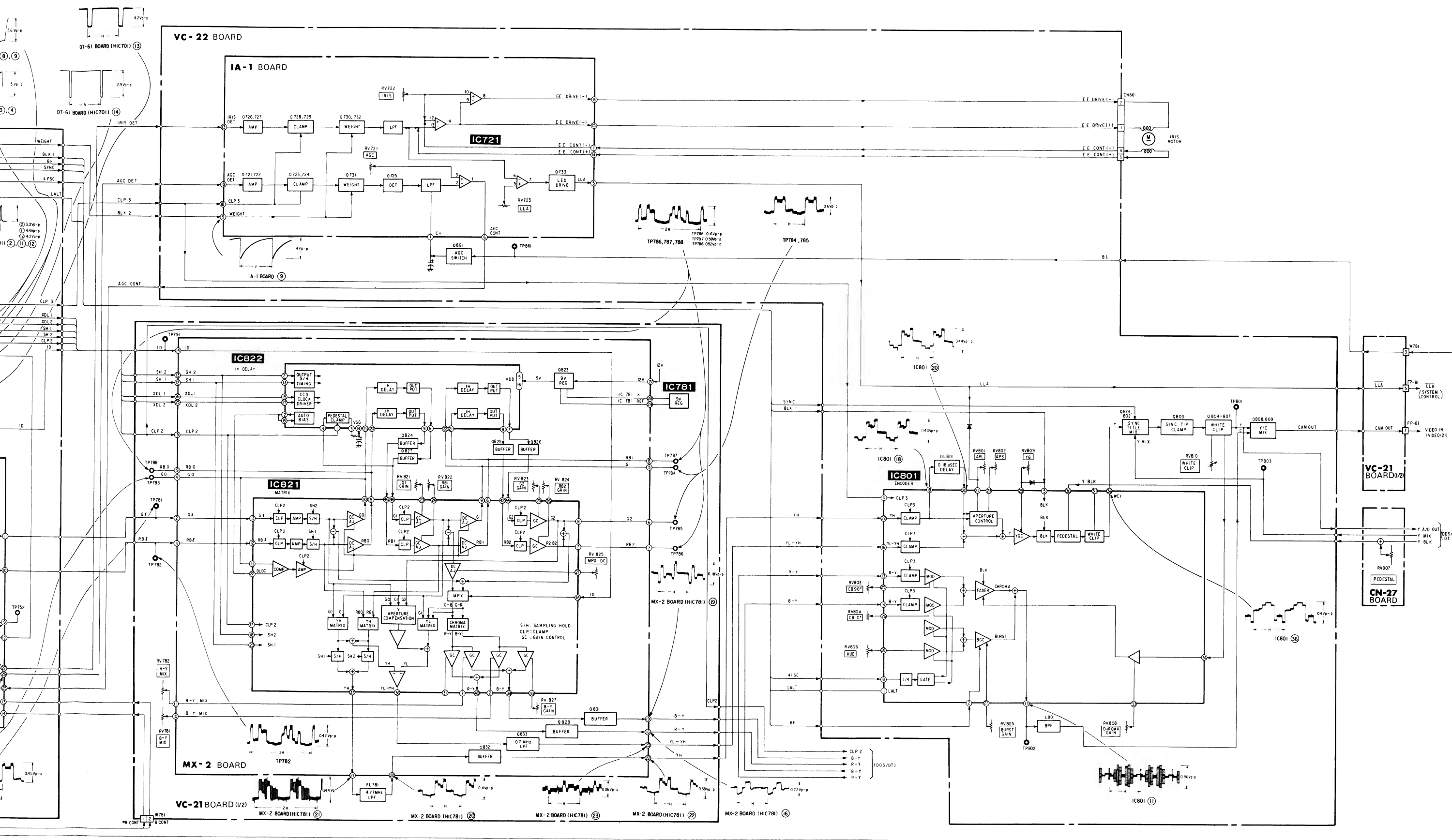


3-2. OVERALL BLOCK DIAGRAM

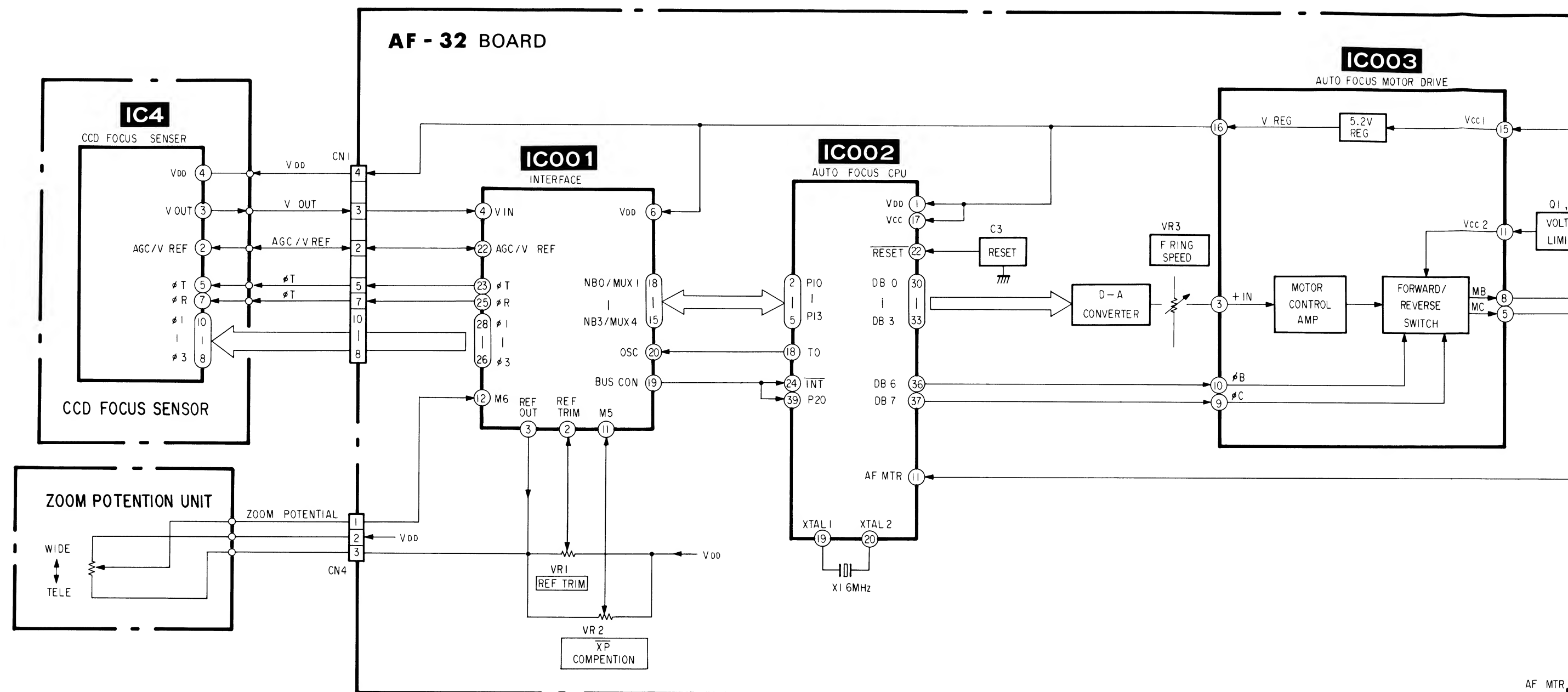


### 3-3. CAMERA BLOCK DIAGRAM

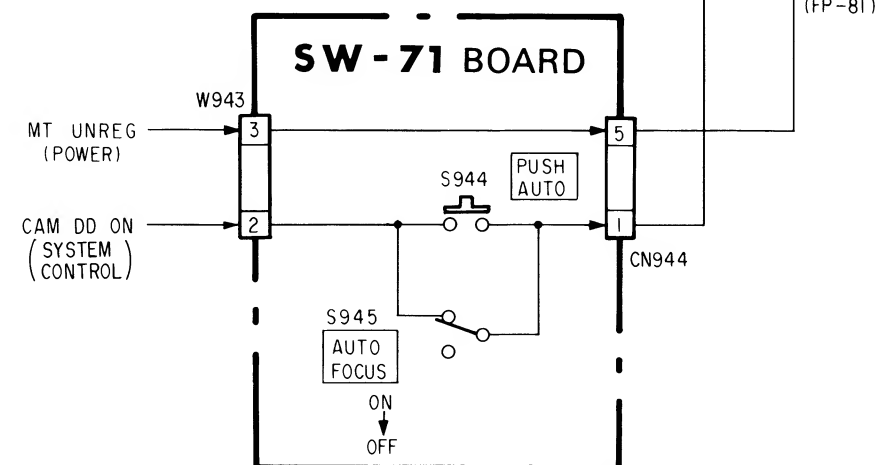
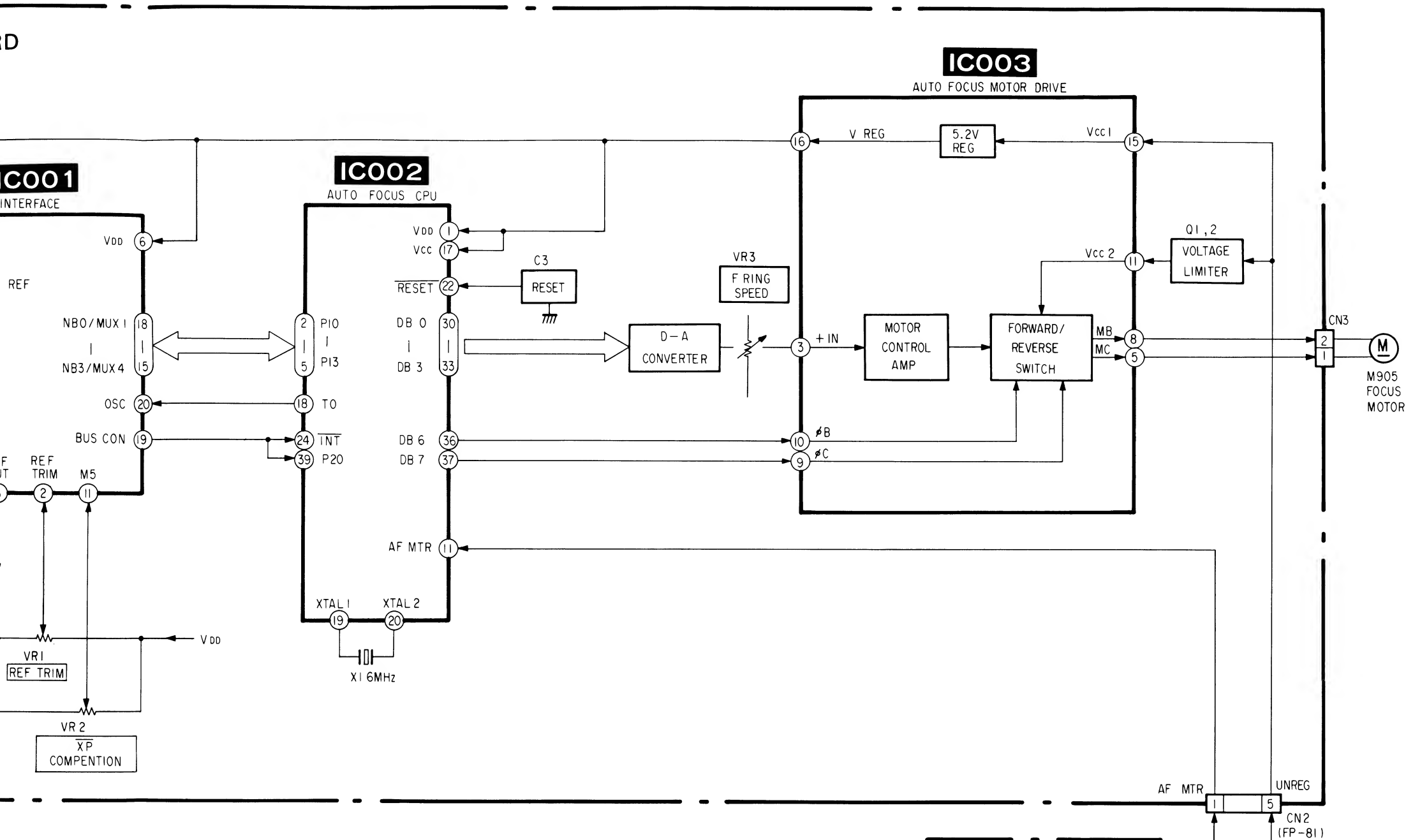




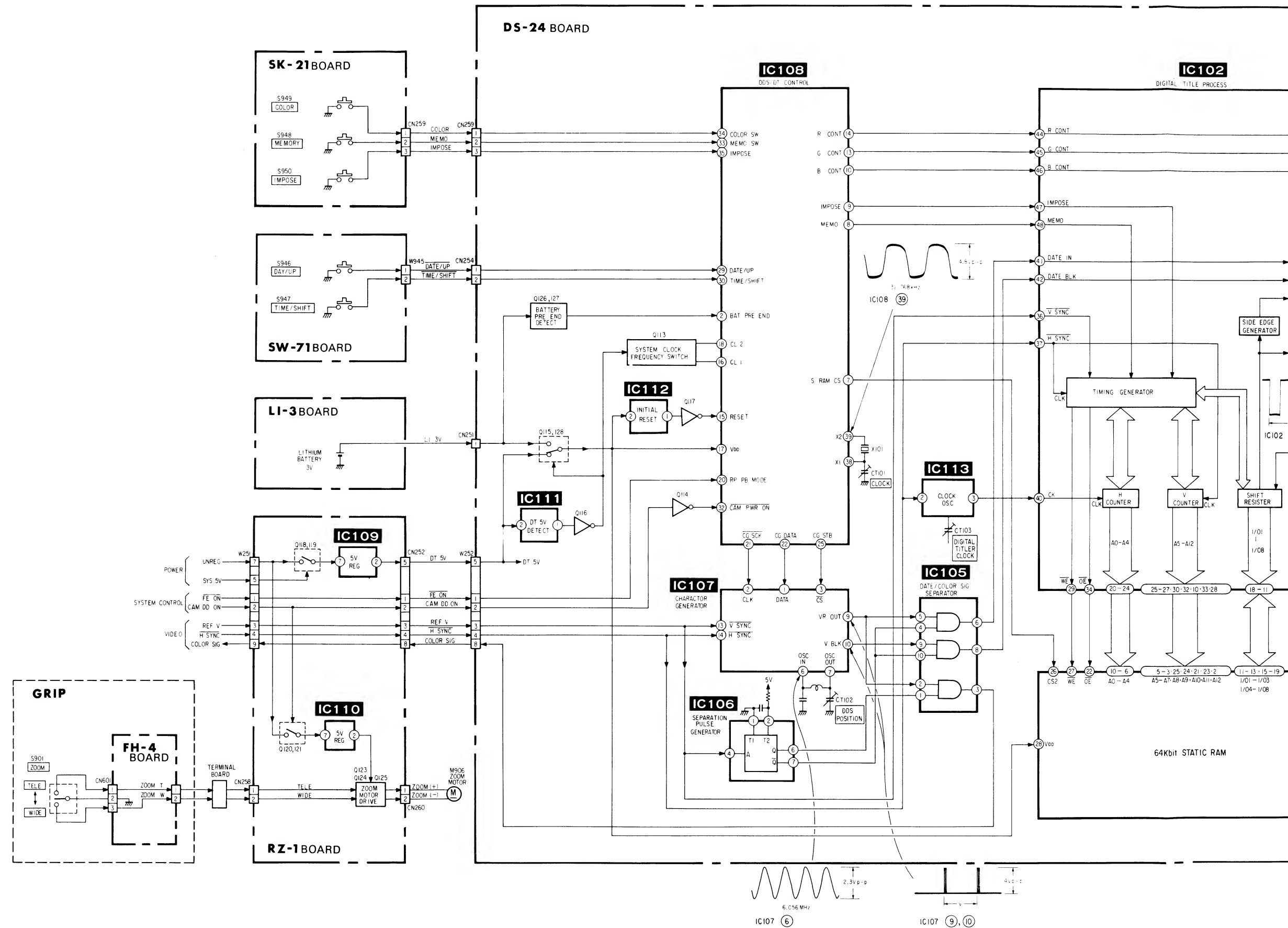
3-4. AUTO FOCUS BLOCK DIAGRAM







### 3-5. DATA DISPLAY, DIGITAL TITLER BLOCK DIAGRAM



BOARD

5V REG

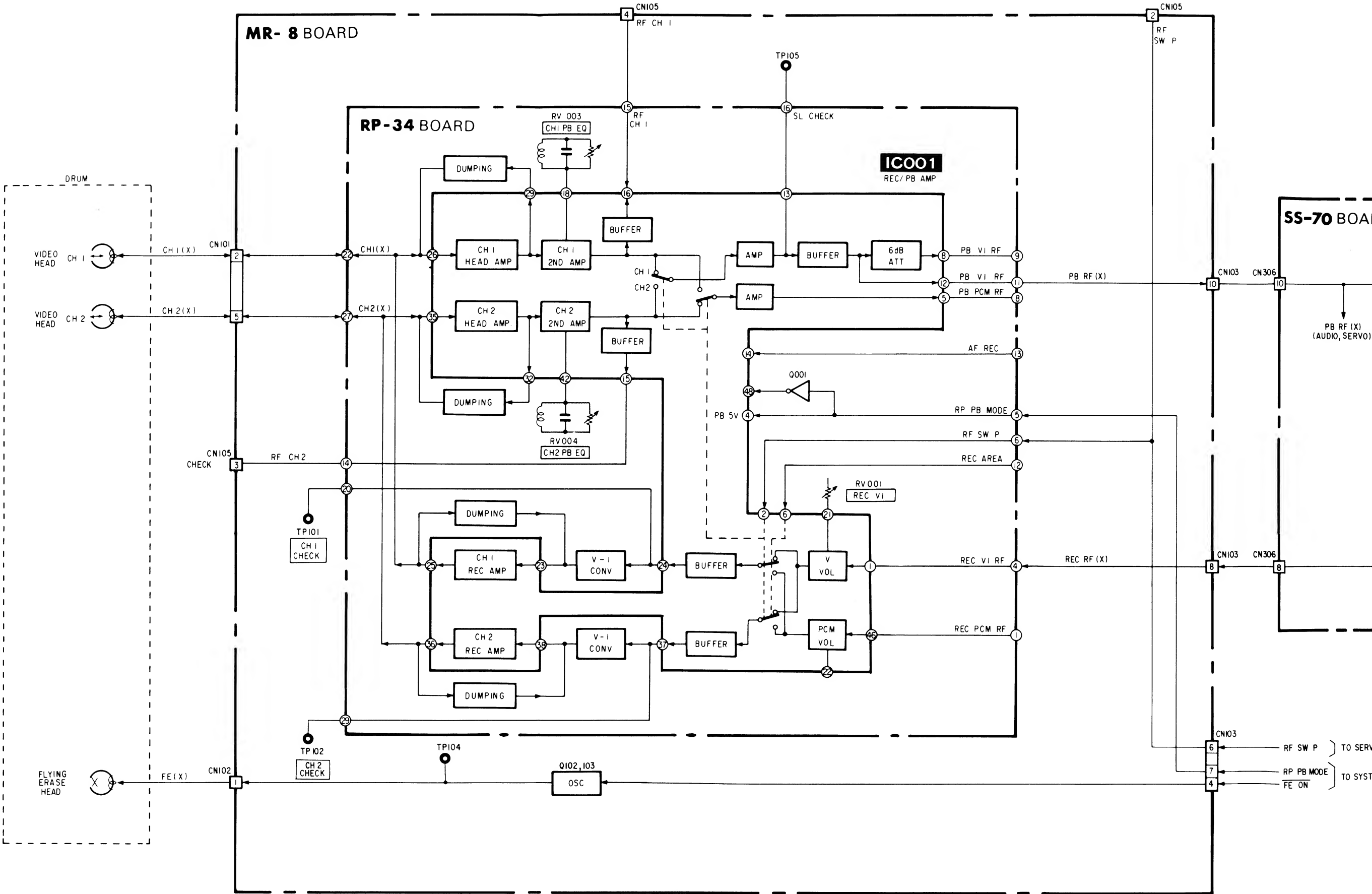
5V REG

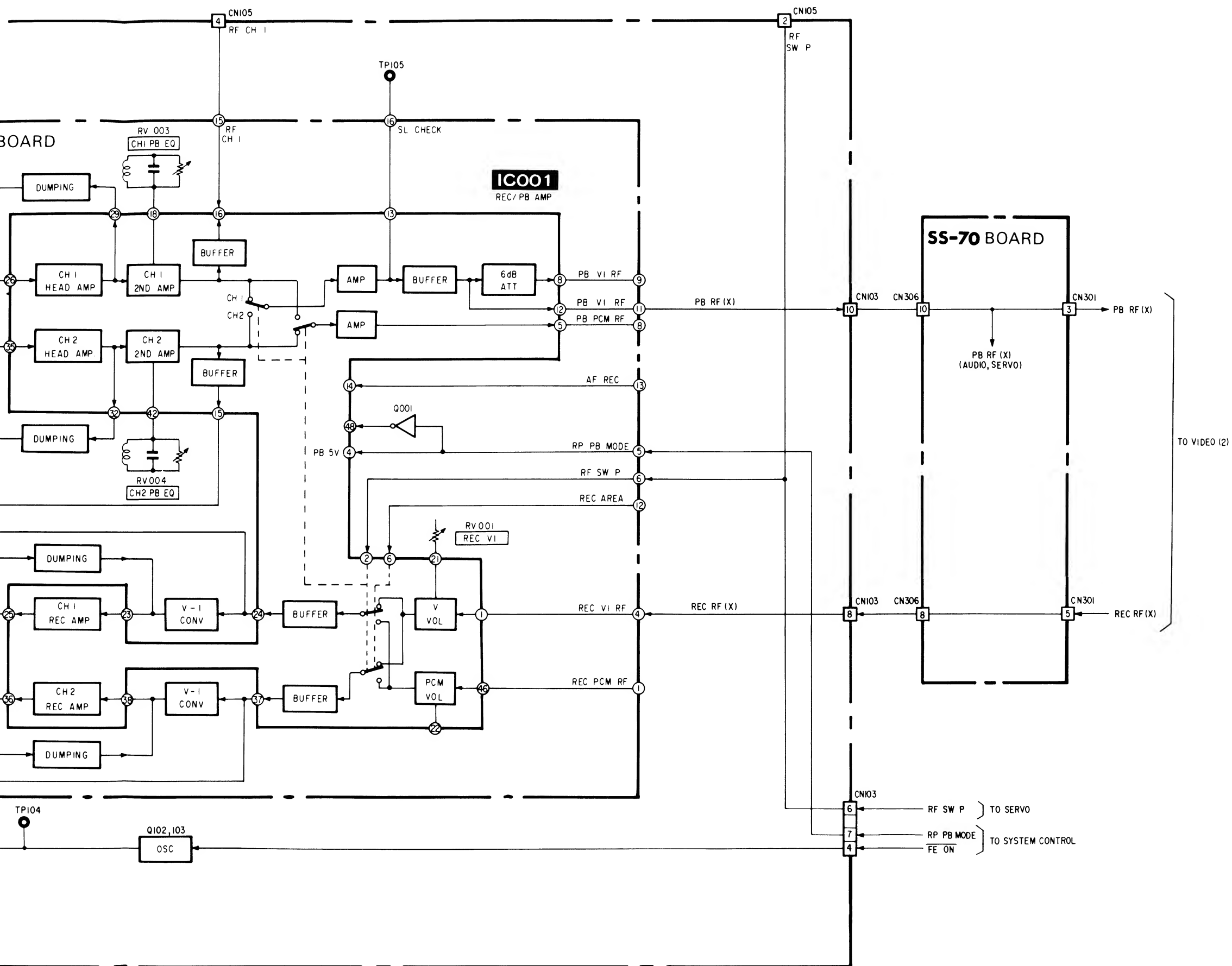
Q123 Q124 Q125

ZOOM MOTOR DRIVE

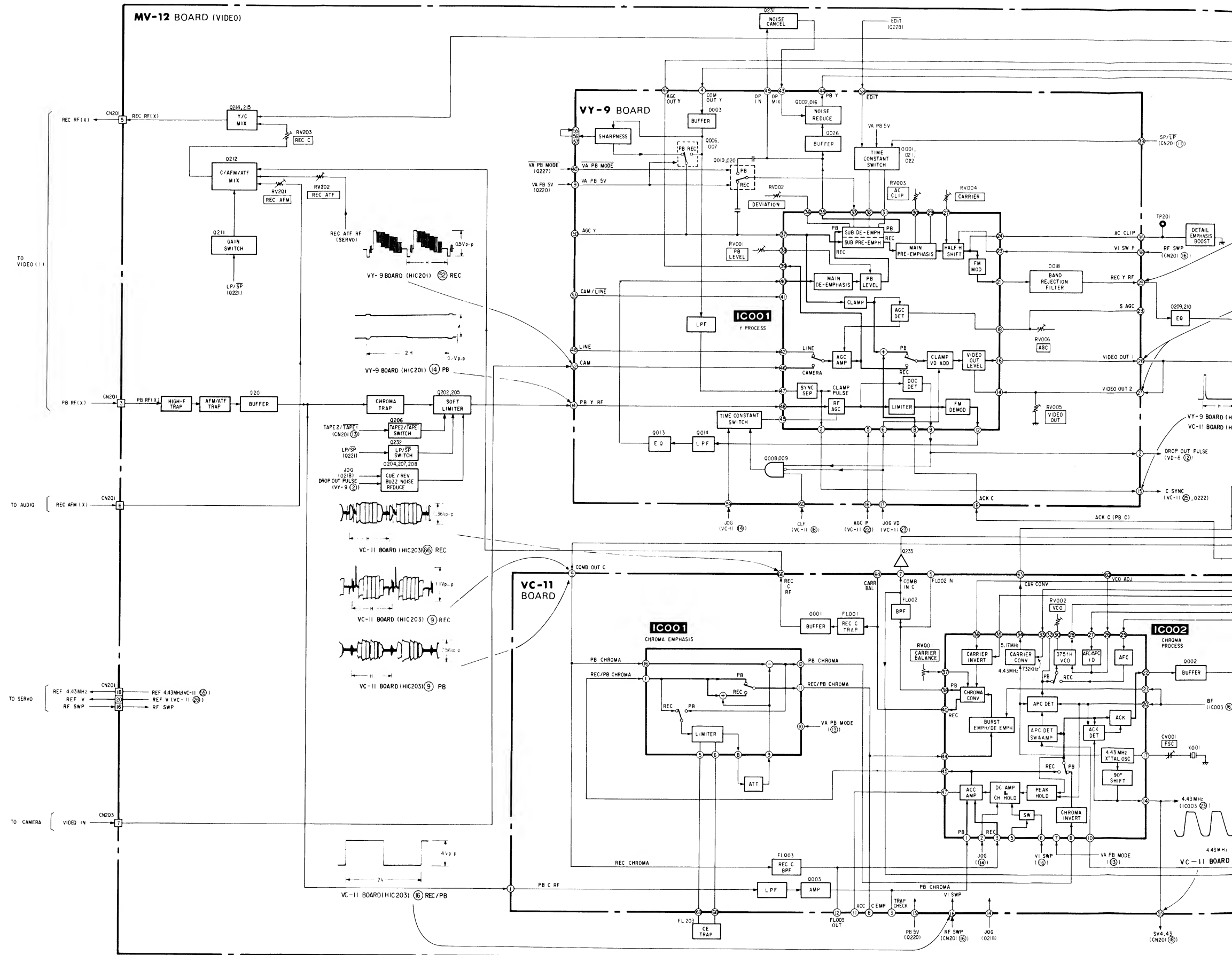
BOARD

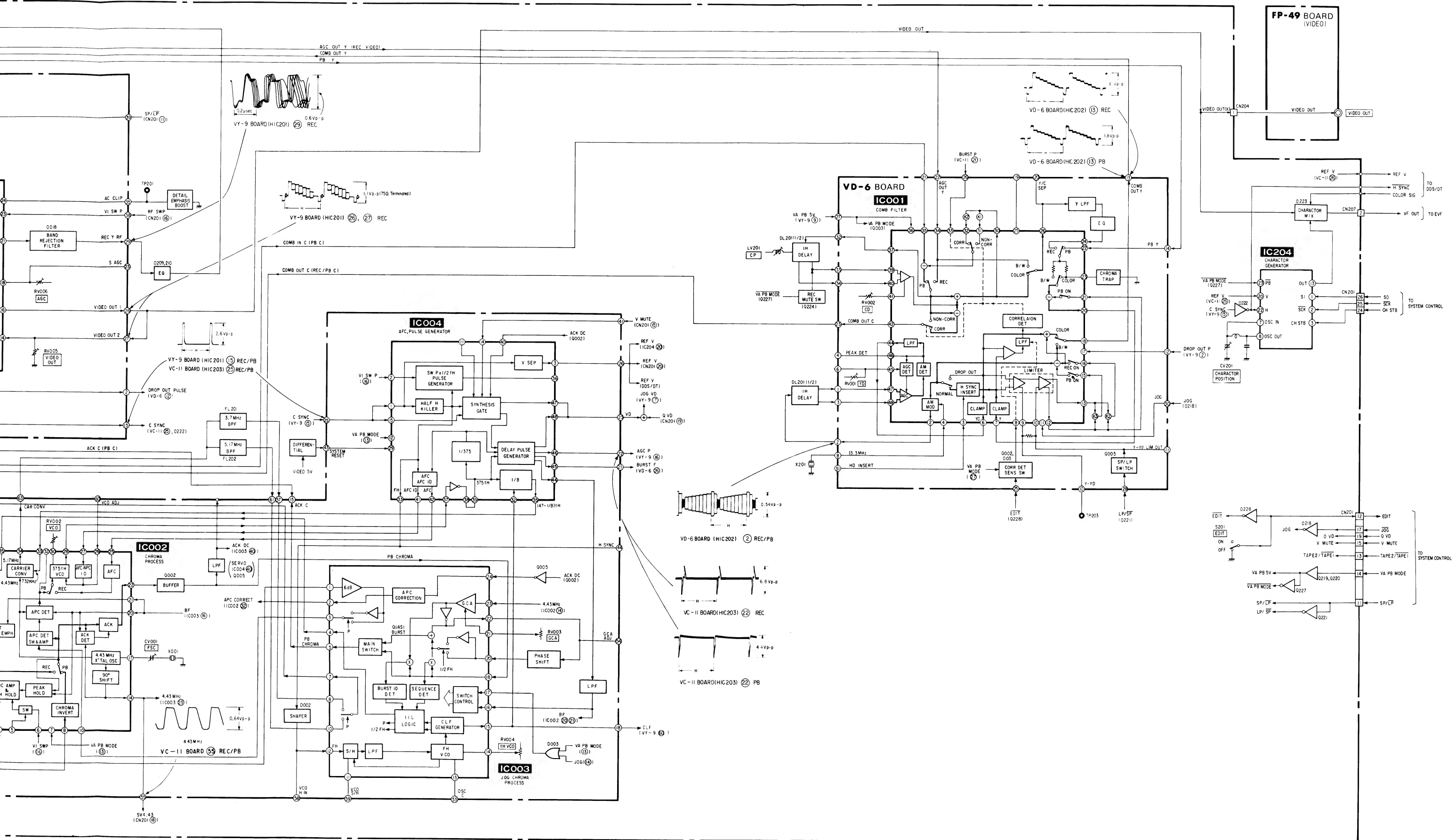
3-6. VIDEO(1) BLOCK DIAGRAM



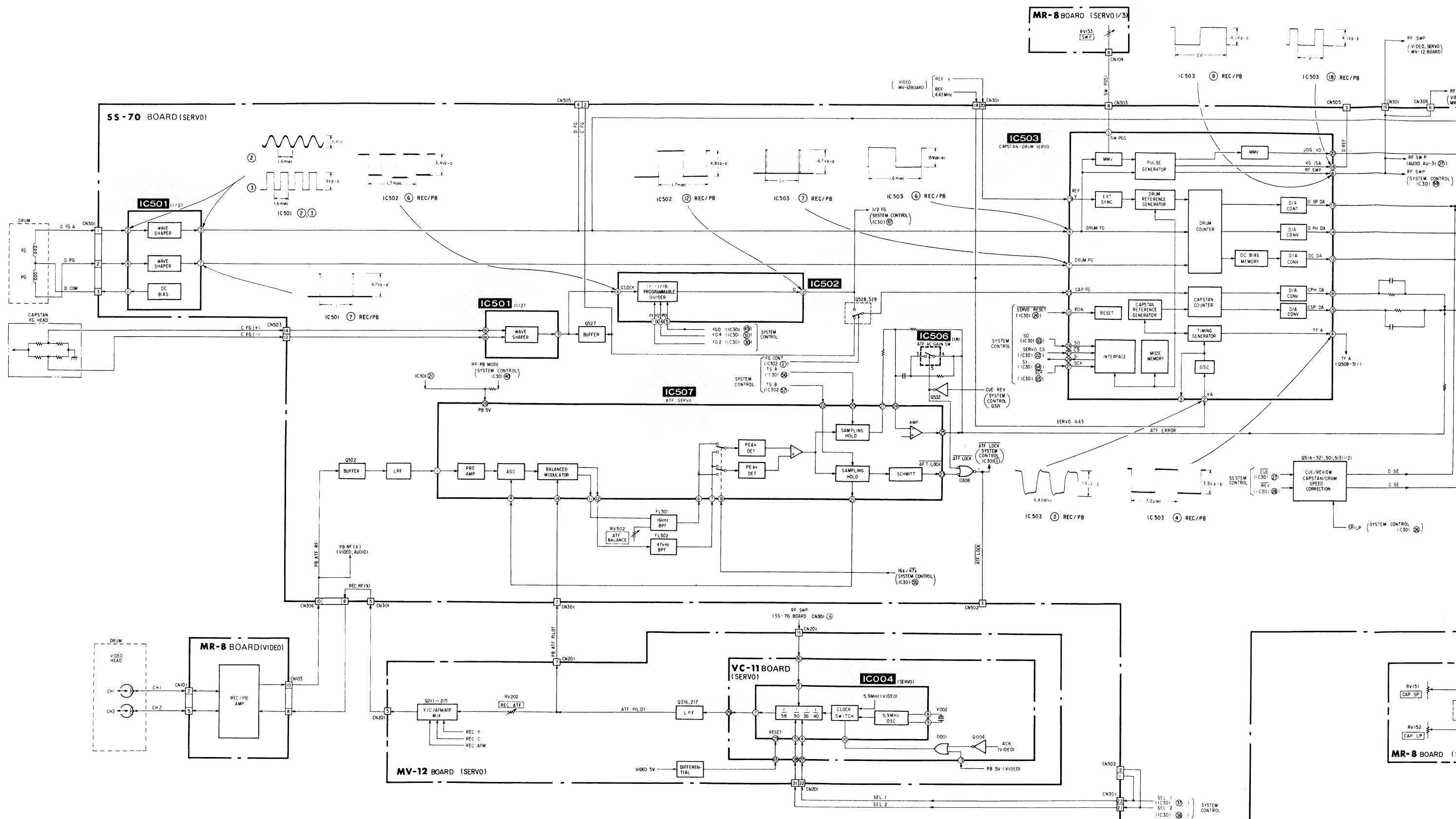


### 3-7. VIDEO(2) BLOCK DIAGRAM

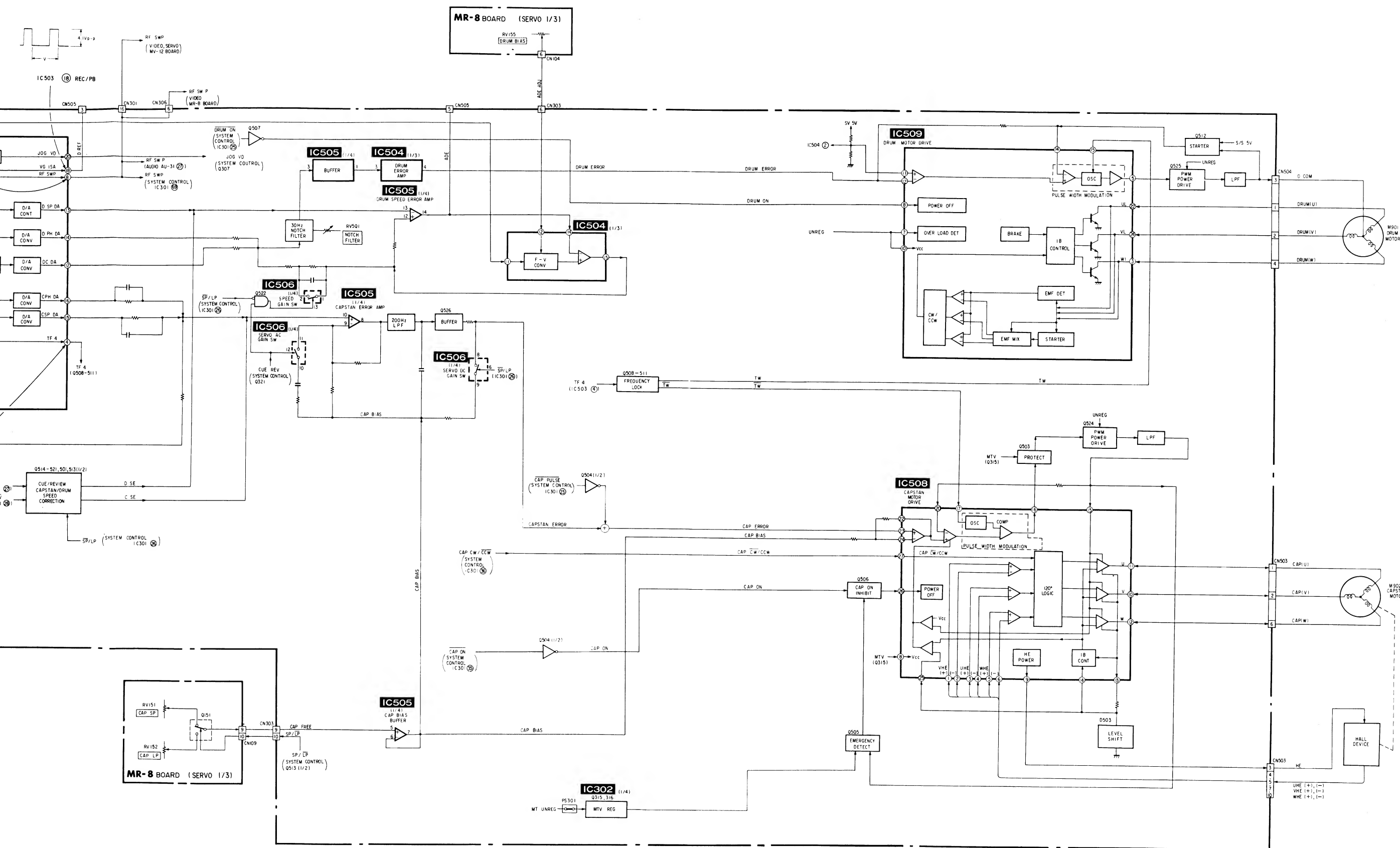




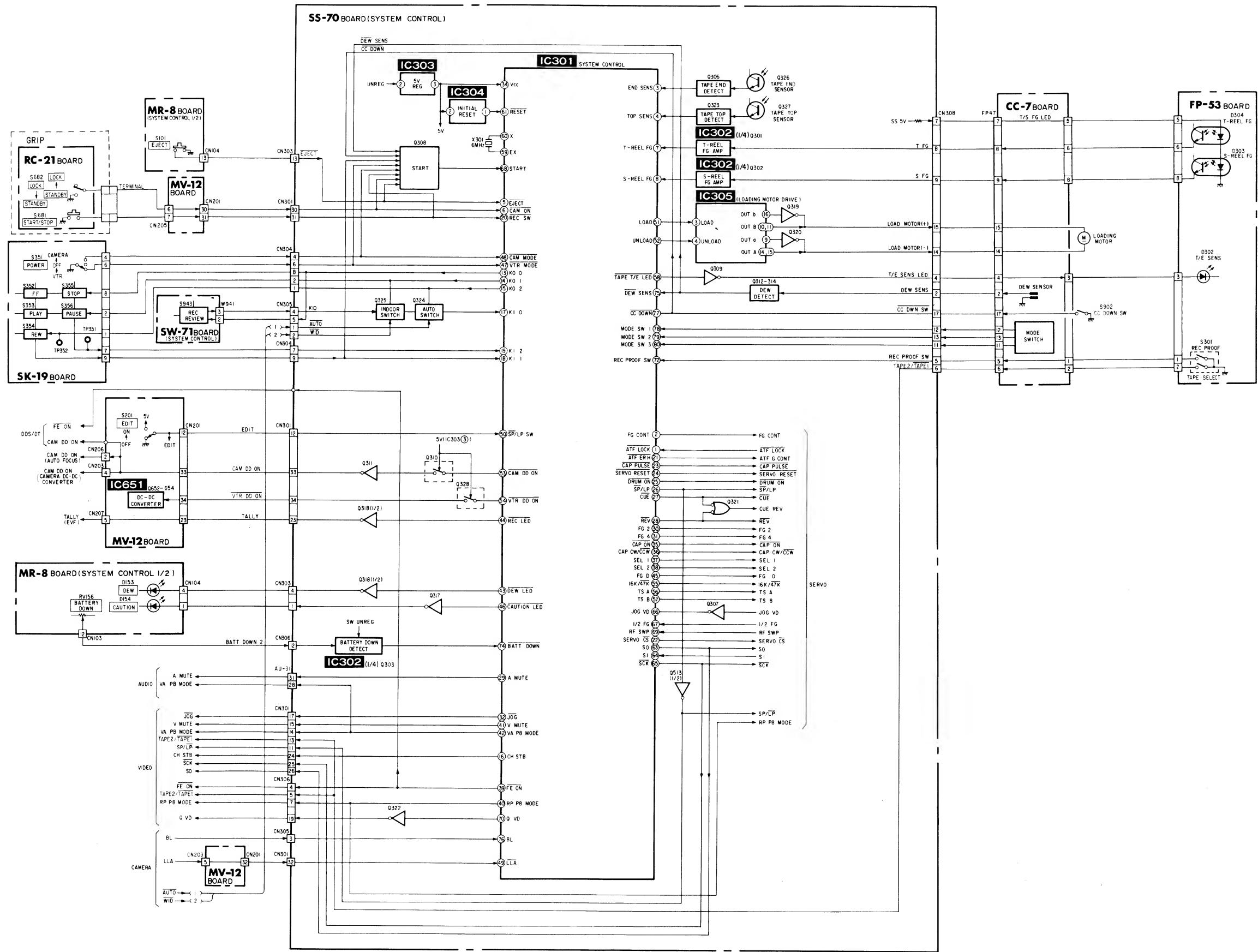
### 3-8. SERVO BLOCK DIAGRAM
















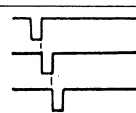
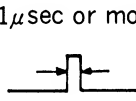



3-9. SYSTEM CONTROL BLOCK DIAGRAM



3-10. PIN FUNCTION (IC301 ON)

Pin No.	Signal
1	ATF L
2	FG CO
3	END S
4	TOP S
5	EJECT
6	CAM C
7	T REE
8	S REE
9	TEST
10	A V <sub>SS</sub>
11	A VR(
12	A V <sub>CC</sub>
13	KO 0
14	KO 1
15	KO 2
16	CH ST
17	KI 0
18	KI 1
19	KI 2
20	REC S
21	ATF E
22	SERVO
23	CAP P
24	SERVO R
25	DRUM

3-10. PIN FUNCTIONS OF SYSTEM CONTROL CPU  
(IC301 ON SS-70 BOARD:MB-88551)

Pin No.	Signal Name	I/O	Signal Shape	Function	STOP	FF	REW	CUE	REV	PB	FR SEARCH FF	FR SEARCH REW	PB PAUSE	REC	REC PAUSE	REC REV
1	ATF LOCK	I	Logic state	"Low" when the ATF phase servo is in the normal phase lock state during playback	H	H	H	L	L	L	L	L	L	L	L	L
2	FG CONT	I	Logic state	CAP FG dividing switching signal "Low" during CUE, REV, and UNLOAD.												
3	END SENS	I		Synchronizes with the rise of TAPE T/E LED to detect this level. "Low" for tape end.												
4	TOP SENS	I		Synchronizes with the fall of TAPE T/E LED to detect this level. "Low" for tape top.												
5	EJECT	I		EJECT key input. Goes "Low" when the EJECT key is pressed.												
6	CAM ON	I	Logic state	CAMERA POWER switch input. Turns on when the slide cover of REC button is lifted, going "Low".	H	H	H	H	H	H	H	H	H	L	L	L
7	T REEL FG	I		T-reel rotation detection signal input. Compared with 1/2 FG signal to detect tape slack.												
8	S REEL FG	I		S-reel rotation detection signal input. Compared with 1/2 FG signal to detect tape slack.												
9	TEST	I		Normally open. For IC check.												
10	A V <sub>SS</sub>			Connected to GND.												
11	A VR(-)			Connected to GND.												
12	A V <sub>CC</sub>			Connected to EVER 5 V.												
13	KO 0	O		} Key matrix output. Reads out input levels of KI0 to KI2 when "Low" is output.												
14	KO 1	O														
15	KO 2	O														
16	CH STB	O		STROBE signal to the character generator (IC204 on MV-12 board). Strobe at rising edge (↑), data and address increment at falling edge (↓).												
17	KI 0	I		} Key matrix input. When key is pressed, the pulse "Low" level of KO0 to KO2 is input.												
18	KI 1	I														
19	KI 2	I														
20	REC SW	I	Logic state	REC START /STOP switch input. "Low" When this button is pressed.												
21	ATF ER H	O	Logic state	Maintained at "Low" level at UNLOAD or STANDBY(REC PAUSE), improves capstan motor rising.	H	H	H	H	H	H	H	H	H	H	L	H
22	SERVO CS	O		Communication chip select signal to servo IC(IC503, CX20035). "Low" When sending serial data.												
23	CAP PULSE	O	Logic state	"Low" level at FF or REW to apply full voltage to the capstan motor. CAP ON signal is PWM drive for smooth rise up. "Low" pulse is output at capstan PWM sensing.	H	L	L	L→H rising	L→H rising	L→H rising	L→H rising	L→H rising	L→H rising	L→H rising	L→H rising	L→H rising
24	SERVO RESET	O		Initial reset pulse to servo IC (IC503, CX20035).												
25	DRUM ON	O	Logic state	Drum motor ON/OFF signal. Drum motor ON at "Low" level.	H	L→H rising	L→H rising	L→H rising	L→H rising	L→H rising	L→H rising	L→H rising	L→H rising	L→H rising	L→H rising	L→H rising

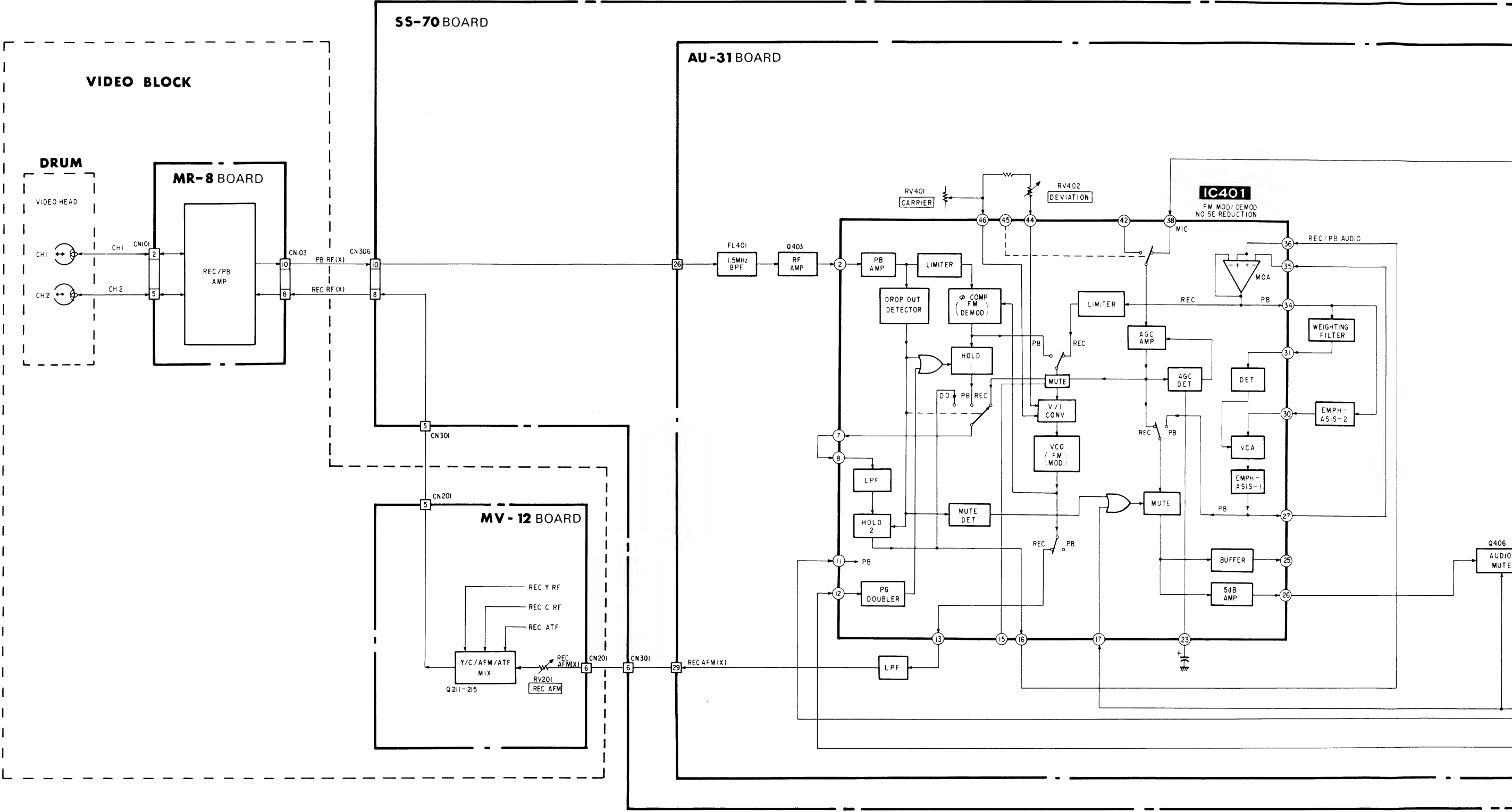
Pin No.	Signal Name	I/O	Signal Shape	Function	STOP	FF	REW	CUE	REV	PB	FR SEARCH FF	FR SEARCH REW	PB PAUSE	REC	REC PAUSE	REC REV															
26	SP/LP	O	Logic state	“Low” : SP mode “High” : LP mode	L	L	L	※ 1 H/L	※ 1 H/L	※ 1 H/L	※ 1 H/L	※ 1 H/L	L	L	L	L															
27	CUE	O	Logic state	“Low” during cue	H	H	H	L	H	H	L	H	H	H	H	H															
28	REV	O	Logic state	“Low” during review	H	H	H	H	L	H	H	L	H	H	H	H															
29	A MUTE	O	Logic state	“High” during voice mute	H	H	H	H	H	L	H	H	H	L	L	H															
30	FG2	O	Logic state	Signal which changes the divide ratio of the cap- stan FG divider (IC502).	L	L	L	H	H	L	H	H	L	L	L	L															
31	FG4	O	Logic state		L	L	L	H	H	L	H	H	L	L	L	L															
32	JOG	O	Logic state	Video circuit normal／variable-speed playback swit- ching signal. “Low” during PB pause, cue or review.	H	H	H	L	L	H	L	L	H	H	H	L															
33	N.C	O	——																												
34	V <sub>cc</sub>	O	——	Connected to EVER 5 V.																											
35	CAP ON	O	Logic state	Capstan motor ON／OFF signal. Capstan motor ON at “Low” level.	H	rising L→H	rising L→H	H	H	rising L→H	H	H	H	rising L→H	H	rising L→H															
36	CAP CW/CCW	O	Logic state	Capstan motor rotation direction switching signal. “Low” at FWD rotation.	L	L	H	L	H	L	L	H	L	L	L	H															
37	SEL1	O	Logic state	Controls the frequency of ATF REF PILOT signal. <table><tr><td>ATF REF PILOT</td><td>f1</td><td>f2</td><td>f3</td><td>f4</td></tr><tr><td>SEL1</td><td>H</td><td>L</td><td>H</td><td>L</td></tr><tr><td>SEL2</td><td>H</td><td>H</td><td>L</td><td>L</td></tr></table>	ATF REF PILOT	f1	f2	f3	f4	SEL1	H	L	H	L	SEL2	H	H	L	L												
ATF REF PILOT	f1	f2	f3		f4																										
SEL1	H	L	H		L																										
SEL2	H	H	L		L																										
38	SEL2	O	Logic state																												
39	FE ON	O	Logic state	Flying erase oscillation ON／OFF signal. “Low” during playback.	H	H	H	H	H	H	H	H	H	L	H	H															
40	RP PB MODE	O	Logic state	REC／PB AMP REC／PB switching signal. “High” during playback.	H	H	H	H	H	H	H	H	H	L	L	H															
41	V MUTE	O	Logic state	Video mute signal. “High” during mute.”	H	H	H	L	L	L	L	L	L	L	L	L															
42	VA PB MODE	O	Logic state	Video audio circuit REC／PB switching signal. “High” during playback.	H	H	H	H	H	H	H	H	H	L	L	H															
43	DEW LED	O	Logic state	Dew condensation warning LED ON／OFF signal. “Low” during condensation.																											
44	REC LED	O	Logic state	REC (tally) LED ON／OFF signal. “Low” during recording.	H	H	H	H	H	H	H	H	H	L	H	H															
45	FG0	O	Logic state	Signal which changes the divide ratio of the capstan FG divider (IC502) . See FG2 and FG4 signals.	H	H	H	L	L	H	L	L	H	H	H	H															
46	CAUTION LED	O	Logic state	Abnormal condition warning LED ON／OFF signal. On at “Low”. Flickers during 4 Hz at clogging or battery down.																											
47	VTR MODE	I	Logic state	Power mode switch input. “Low” in VCR mode.	L	L	L	L	L	L	L	L	L	H	H	H															
48	CAM MODE	I	Logic state	Power mode switch input. “Low” in camera mode.	H	H	H	H	H	H	H	H	H	L	L	L															
49	LLA	I	Logic state	Insufficient light alarm signal input. “Low” during insufficient light.																											
50	SP/LP SW	I	Logic state	SP／LP mode switching input. “High” in LP mode.																											

※ 1 Dependent upon recording mode (SP/LP) of playback tape.

Pin No.	Signal Name	I/O	Signal Shape	Function	STOP	FF	REW	CUE	REV	PB	FR SEARCH FF	FR SEARCH REW	PB PAUSE	REC	REC PAUSE	REC REV														
51	LOAD	O	Logic state	<div>Loading motor control signal.</div> <table><tr><td>Operation Signal name</td><td>LOAD</td><td>UNLOAD</td><td>BRAKE</td></tr><tr><td>LOAD</td><td>H</td><td>L</td><td>H</td></tr><tr><td>UNLOAD</td><td>L</td><td>H</td><td>H</td></tr></table>	Operation Signal name	LOAD	UNLOAD	BRAKE	LOAD	H	L	H	UNLOAD	L	H	H														
Operation Signal name	LOAD	UNLOAD	BRAKE																											
LOAD	H	L	H																											
UNLOAD	L	H	H																											
52	UNLOAD	O	Logic state																											
53	CAM DD ON	O	Logic state	Camera power supply control. On at “Low”.	H	H	H	H	H	H	H	H	H	L	L	L														
54	VTR DD ON	O	Logic state	VTR power supply control. On at “Low”.	L	L	L	L	L	L	L	L	L	H	H	H														
55	16K/47K	O	Logic state	ATF／BPF switching signal. “Low” at detection of ATF error on f <sub>1</sub> and f <sub>2</sub> tracks. “High” during detection of ATF error on f <sub>2</sub> and f <sub>4</sub> tracks.																										
56	TS A	O		ATF error sampling hold signal. “Low” during sampling. “High” during hold.																										
57	TS B	O		ATF lock sampling hold signal. “Low” during sampling. “High” during hold.																										
58	TAPE T/E LED	O		<div>Tape top／end detection LED ON／OFF signal.</div> <table><tr><td>Mode</td><td>REC/PB</td><td>CUE/REV</td><td>FF/REW</td></tr><tr><td>T<sub>1</sub></td><td>100</td><td>14</td><td>2</td></tr><tr><td>T<sub>L</sub></td><td>1</td><td>1</td><td>1</td></tr></table> <div>(Unit:msec)</div>	Mode	REC/PB	CUE/REV	FF/REW	T <sub>1</sub>	100	14	2	T <sub>L</sub>	1	1	1														
Mode	REC/PB	CUE/REV	FF/REW																											
T <sub>1</sub>	100	14	2																											
T <sub>L</sub>	1	1	1																											
59	EX	I		} 6.0MHz crystal oscillation connecting pin.																										
60	X	I																												
61	RESET	I				Reset at “Low”.																								
62	NC																													
63	SO	O	Serial signal (pulse)	Serial communication output to servo IC (IC503 CX20035), character generator (IC204 on MV-12 board, μPD6105G) .																										
64	SI	I	Serial signal (pulse)	Serial communication input from servo IC (IC503, CX20035) .																										
65	SCK	O	Clock pulse	Serial communication clock pulse output.																										
66	JOG VD	I		Q VD signal producing generation timing pulse from servo IC.																										
67	1/2FG	I		The signal obtained by capstan FG divided by 1／2. Counts tape running distance at edit recording.																										
68	START	I		Releases CPU sleep mode at the rise (↑) of pulse input.	L	L	L	H	H	L	H	H	L	L	L	H														
69	RF SW PULSE	I		RF switch pulse input.																										
70	Q VD	O		Outputs the quasi VD signal to be inserted in the video signal during variable-speed playback.	H/L	H/L	H/L	H/L	H/L	H/L	H/L	H/L	H/L	H	H	H														
71	V <sub>ss</sub>	—		Connected to GND.	H	H	H	H	H	H	H	H	H	H	H	H														
72	REC PROOF SW	I	Logic state	“Low” when cassette’s error erasure prevention switch is set to the erasure prevention side.	H	H	H	H	H	H	H	H	H	H	H	H														

Pin No.	Signal Name	I/O	Signal Shape	Function	STOP	FF	REW	CUE	REV	PB	FR SEARCH FF	FR SEARCH REW	PB PAUSE	REC	REC PAUSE	REC REV
73	N.C			Open												
74	BAT DOWN	I	Logic state	“Low” during low battery voltage.												
75	DEW SENS	I	Logic state	“Low” during condensation (dew) .												
76	BL	I	Logic state	BACK LIGHT (back light correction) switch input for EVF display. “Low” during back light correction.												
77	CC DOWN	I	Logic state	Cassette compartment down switch input. “High” during cassette compartment is up;“Low” during cassette compartment down.	L	L	L	L	L	L	L	L	L	L	L	L
78	MODE SW1	I	Logic state	} Mechanical mode switch input (3-bit configuration, for mechanical position detection) .												
79	MODE SW2	I	Logic state													
80	MODE SW3	I	Logic state													

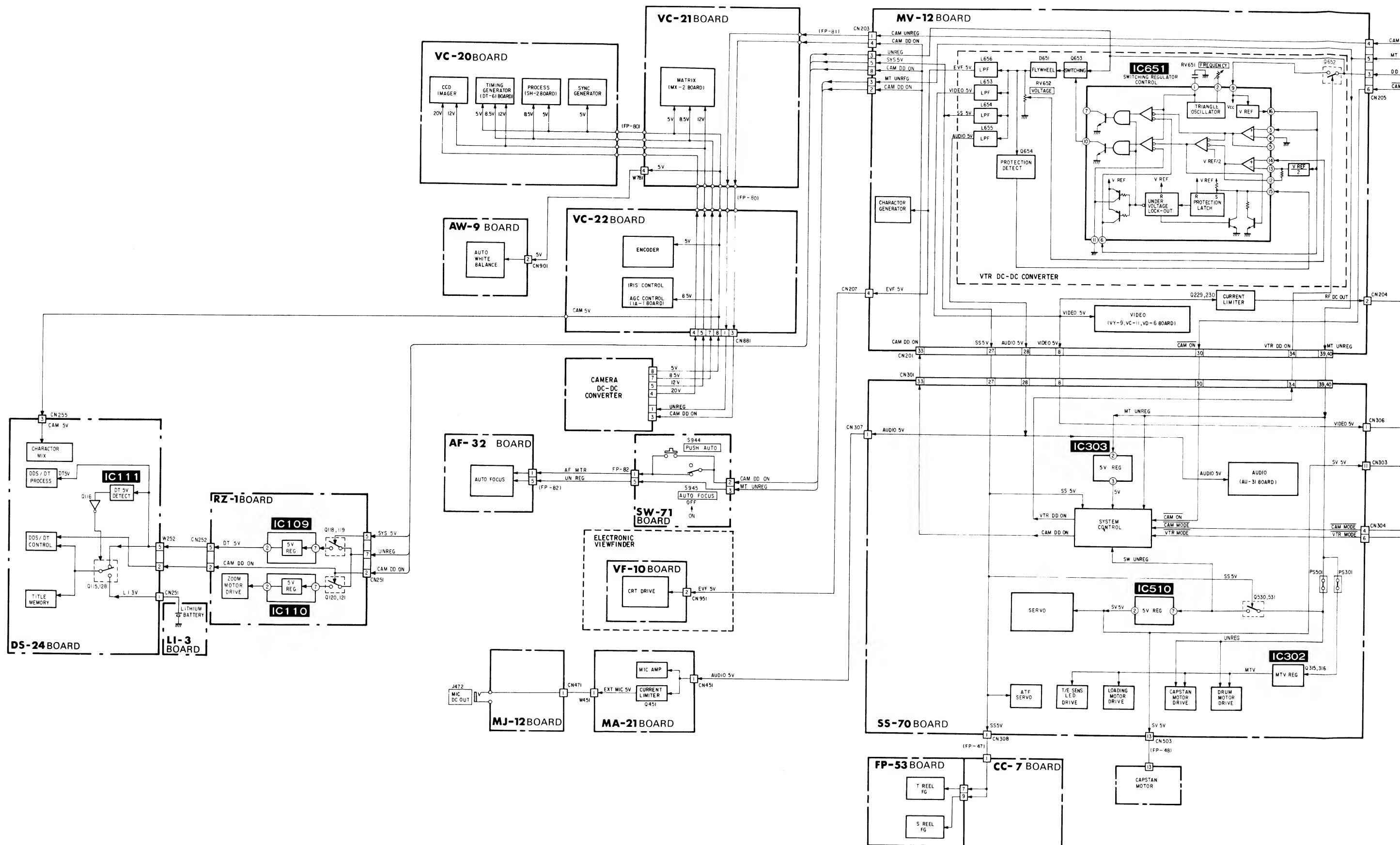
3-11. AUDIO BLOCK DIAGRAM

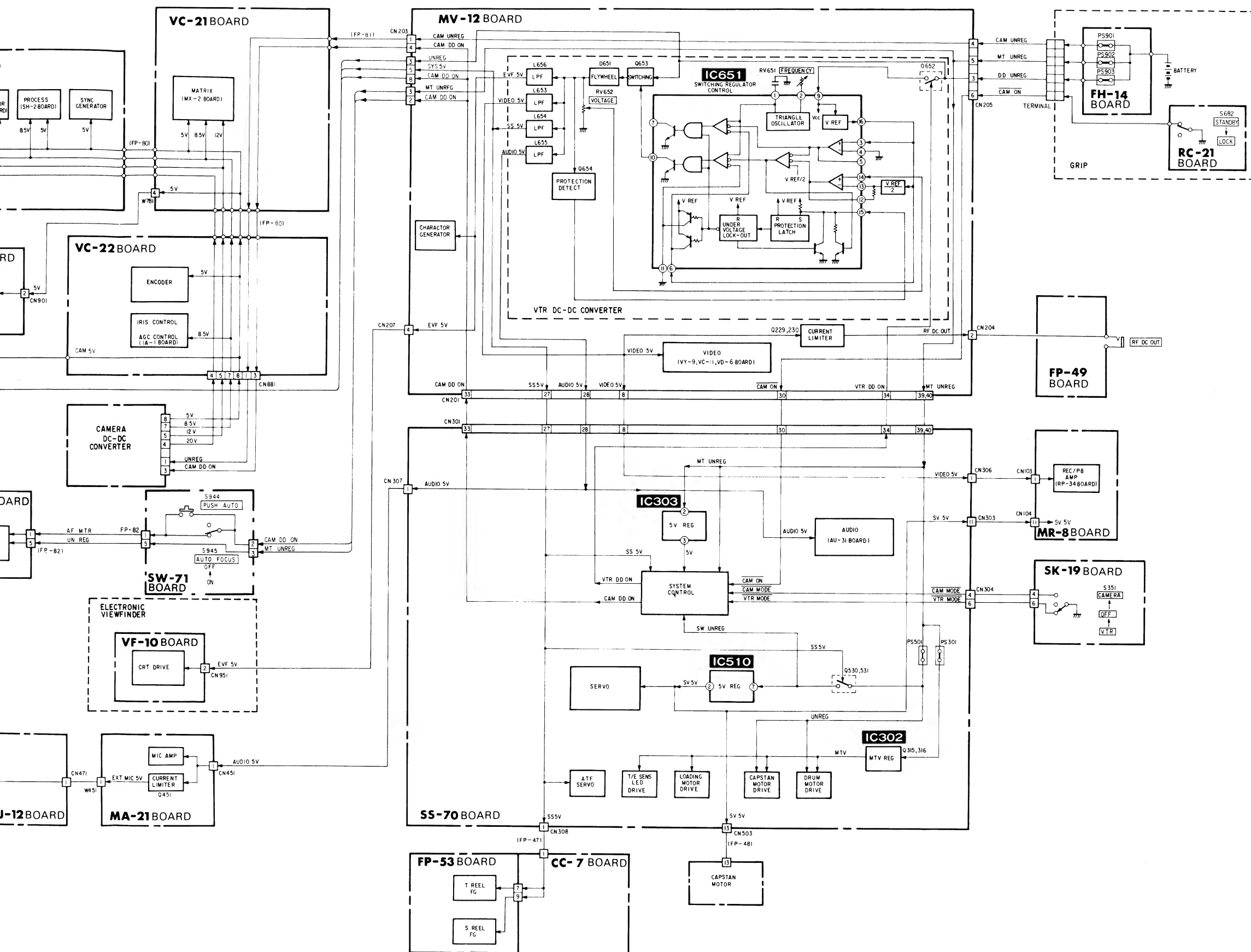




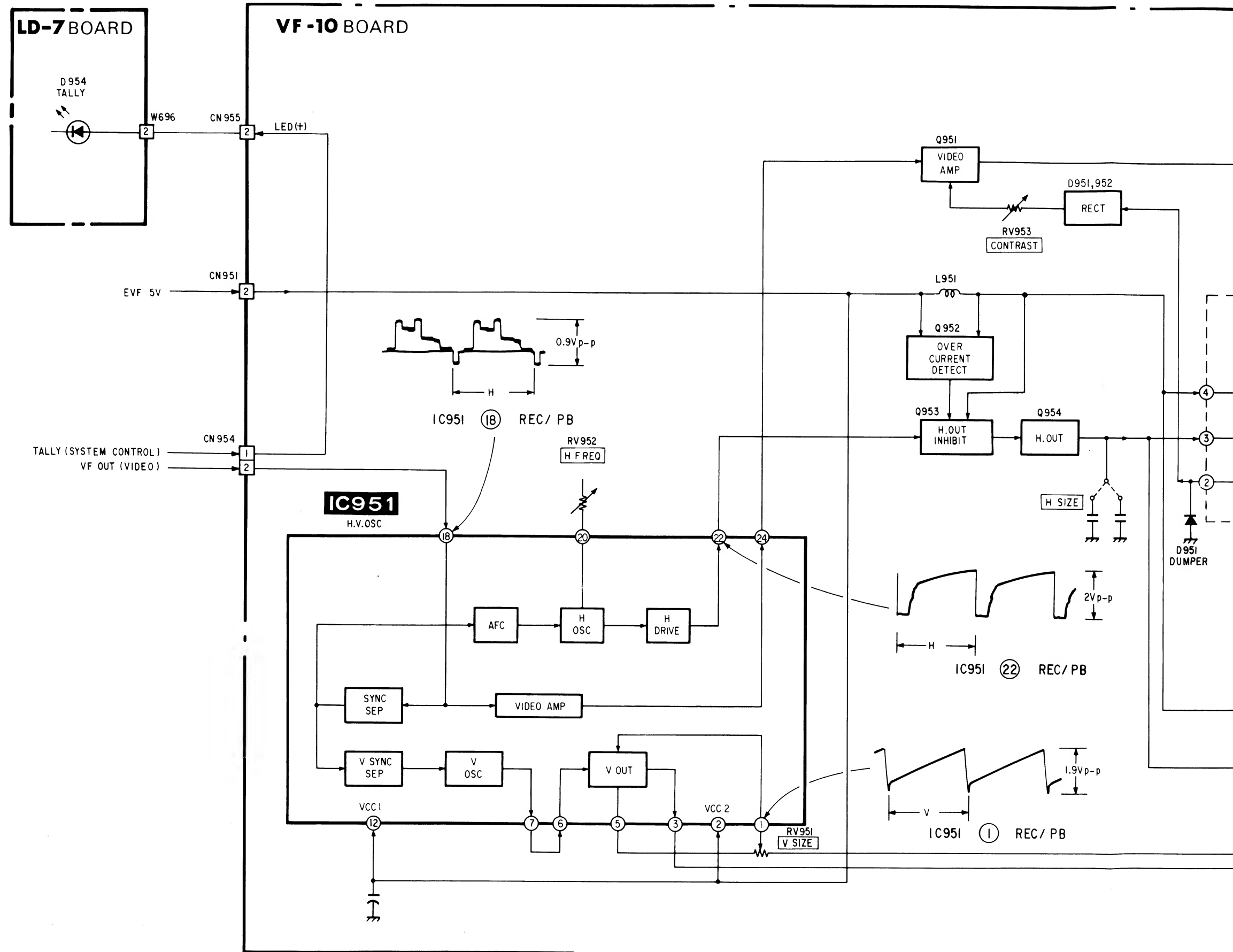


### 3-12. POWER BLOCK DIAGRAM

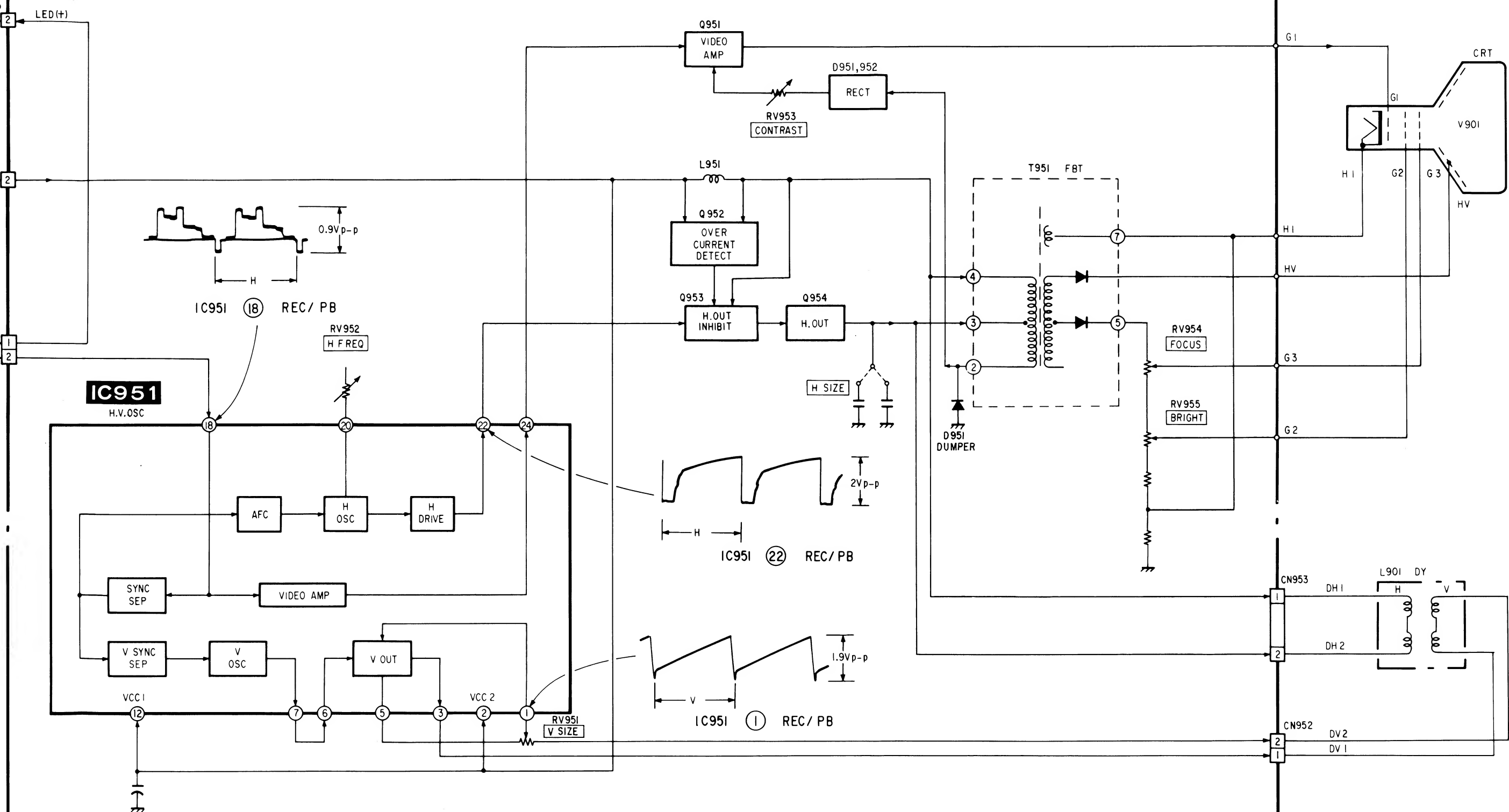




3-13. VIEWFINDER BLOCK DIAGRAM



# VF-10 BOARD

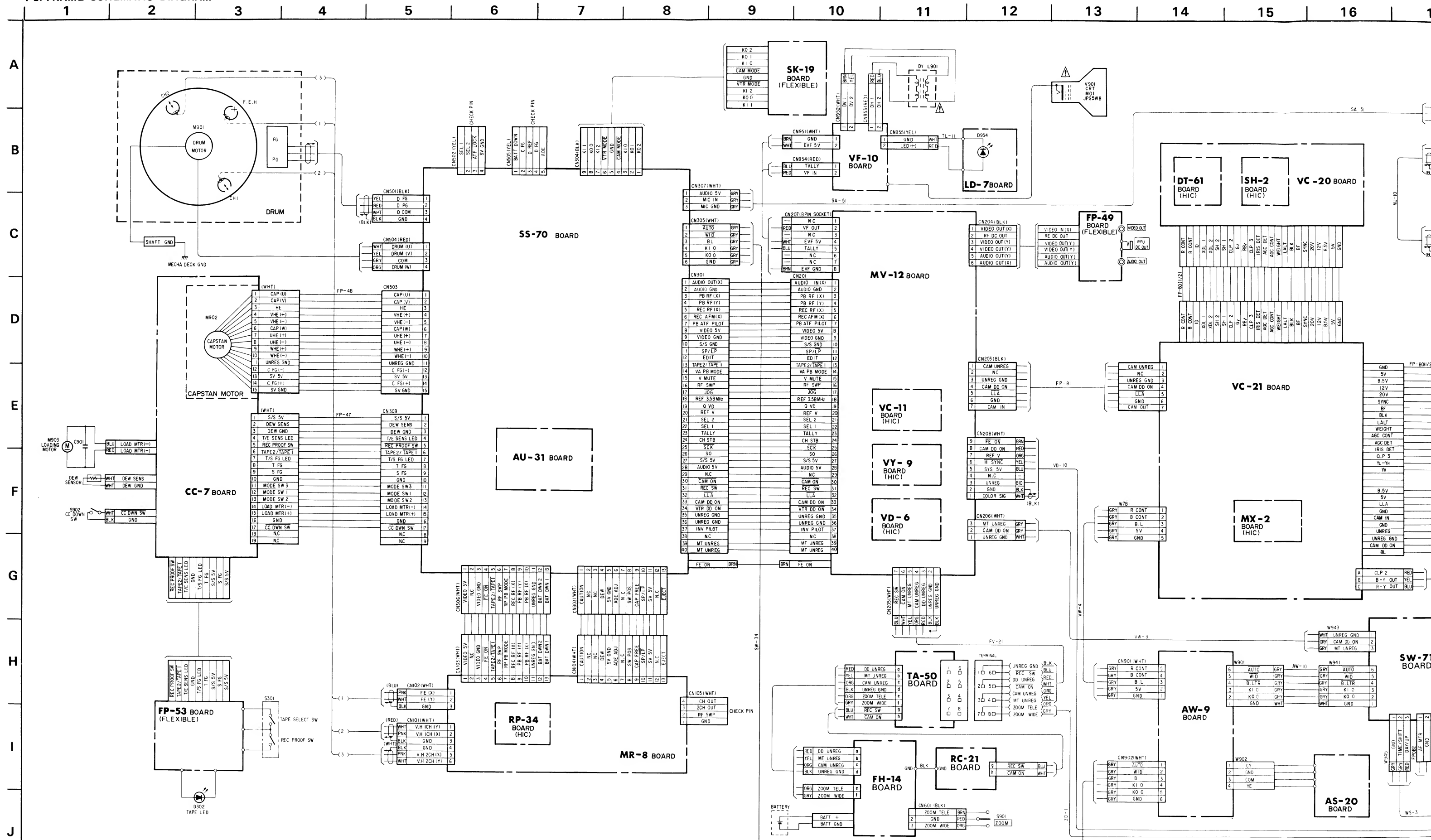


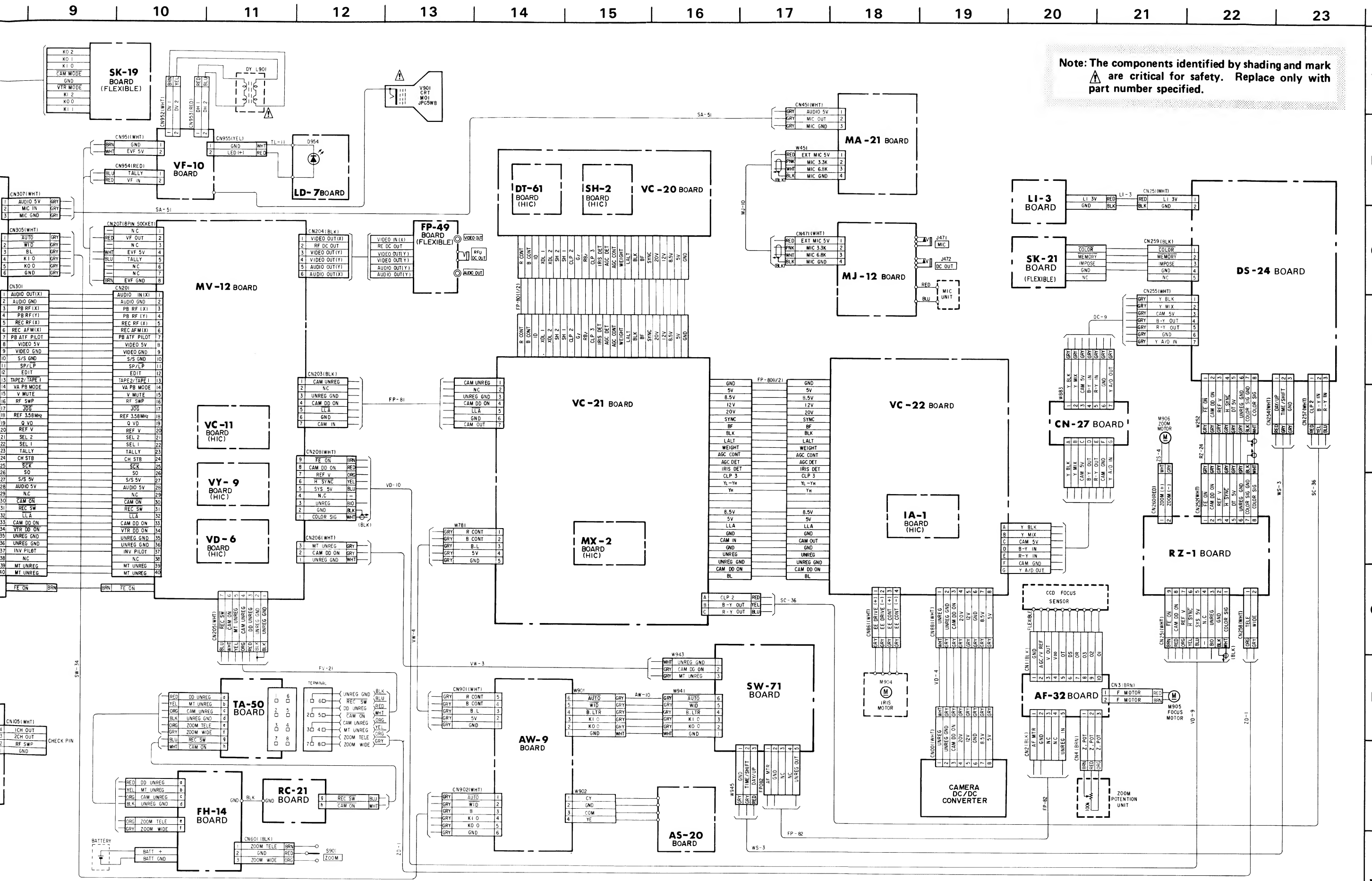
## SECTION 4

## PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAM

## 4-1. FRAME SCHEMATIC DIAGRAM

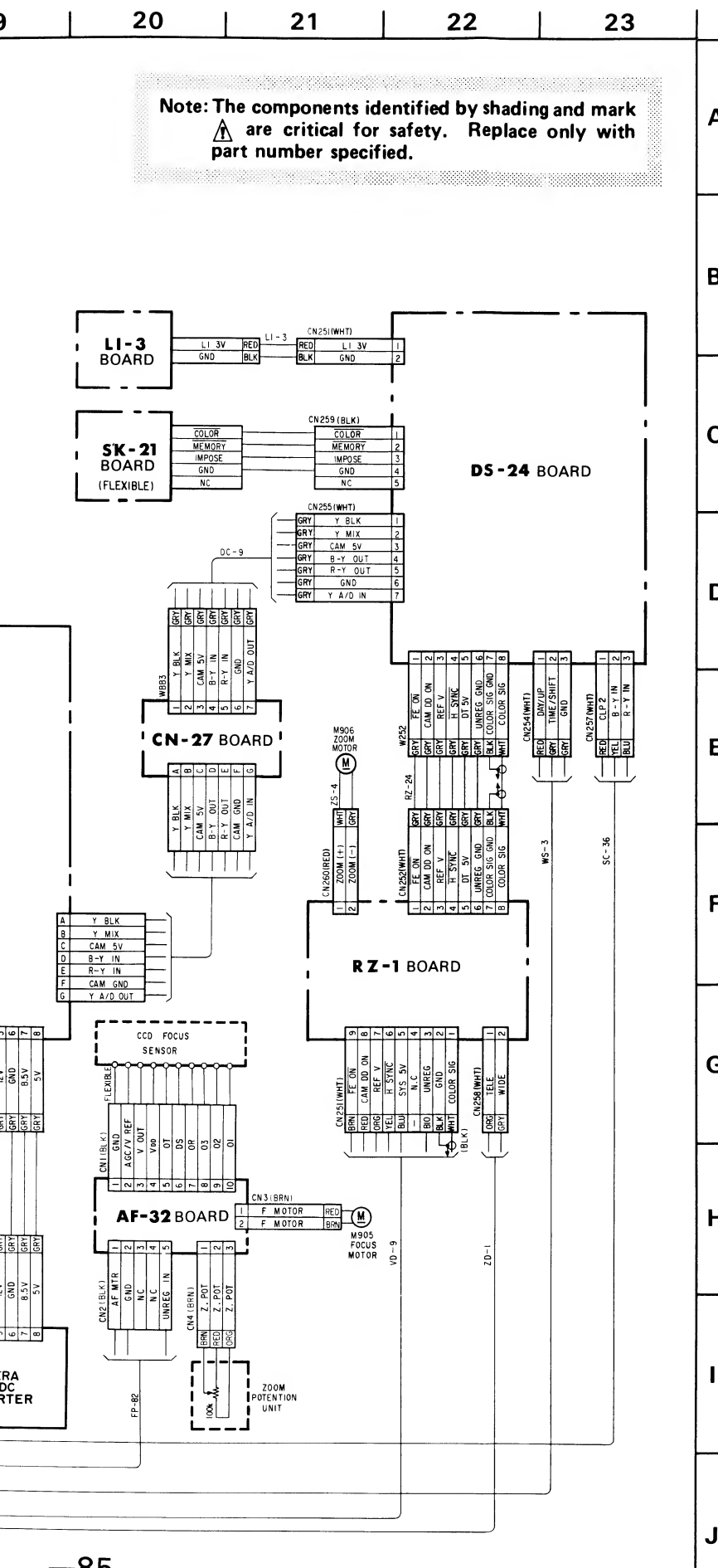
FRAME FRAME





Precar

- With
- it is u
- Since
- corre
- When
- ROM
- IC701
- ROM
- repla
- After
- CCD
- well
- light



### Precantions for replacement of CCD imager block.

- With a pair of IC701 (CCD imager) on the VC-20 complete board and IC002 (corrector ROM) on the DT-61 complete board, it is used a repair part of the CCD imager block.  
Since corrector ROM IC is manufactured to match the CCD imager, replacement of a single unit of the CCD imager corrector ROM cannot be allowed.
- When both a CCD imager and the corrector ROM, replace both the CCD imager and the corrector ROM, when a corrector ROM is not mounted on the service set, install a corrector ROM which is supplied anew.
- IC701 (CCD imager) is not mounted on the VC-20 complete board to be supplied as a repair part, and IC002 (corrector ROM) is not mounted on the DT-61 complete board to be supplied as a repair part. When the respective boards are replaced, remove the respective ICs from the old boards and install them to the new ones respectively.
- After the CCD imager block has been replaced, perform the entire adjustments of the camera section.
- CCD imager is structurally in case of being broken down by static electricity. For this reason, take care to handle it as well as MOS IC. Moreover, care should be taken for dust not to be stuck on the light reseiving section and for strong light not to get into there.



**Note:**

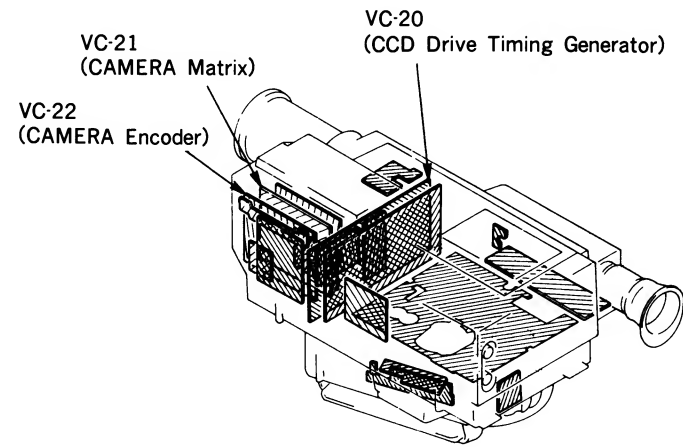
- : indicates a lead wire mounted on the component side.
- : indicates a lead wire mounted on the printed side.
- ⊗ : Through hole.
- : Pattern from the side which enables seeing.
- : Pattern from the side which enables seeing.
- : B+ pattern from the side which enables seeing.

**Caution:**

Pattern face side: Parts on the pattern face side seen from (Solder Side) the pattern face are indicated.

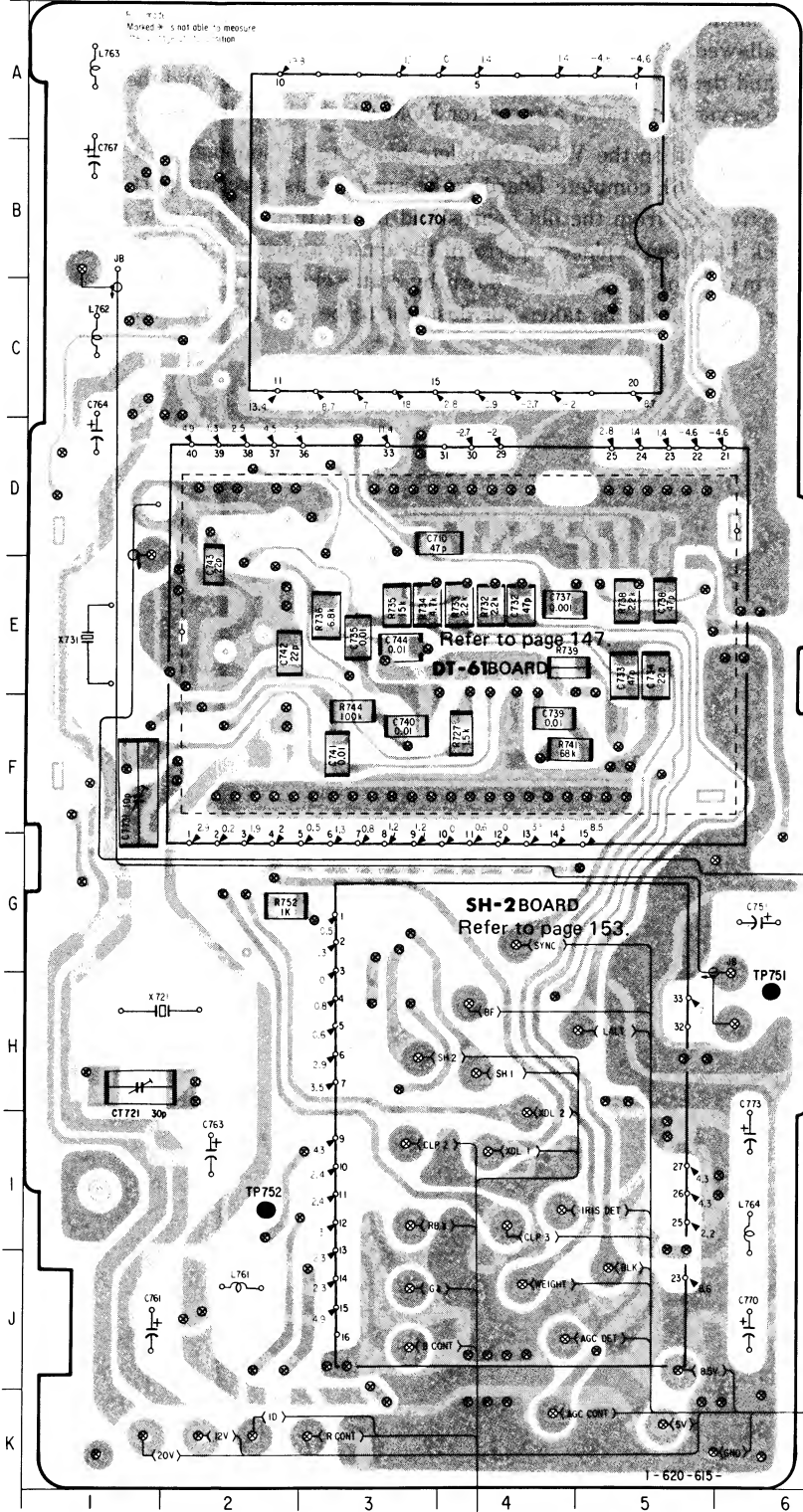
Parts face side: Parts on the parts face side seen from (Component Side) the parts face are indicated.

When indicating parts by reference number, please include the board name.

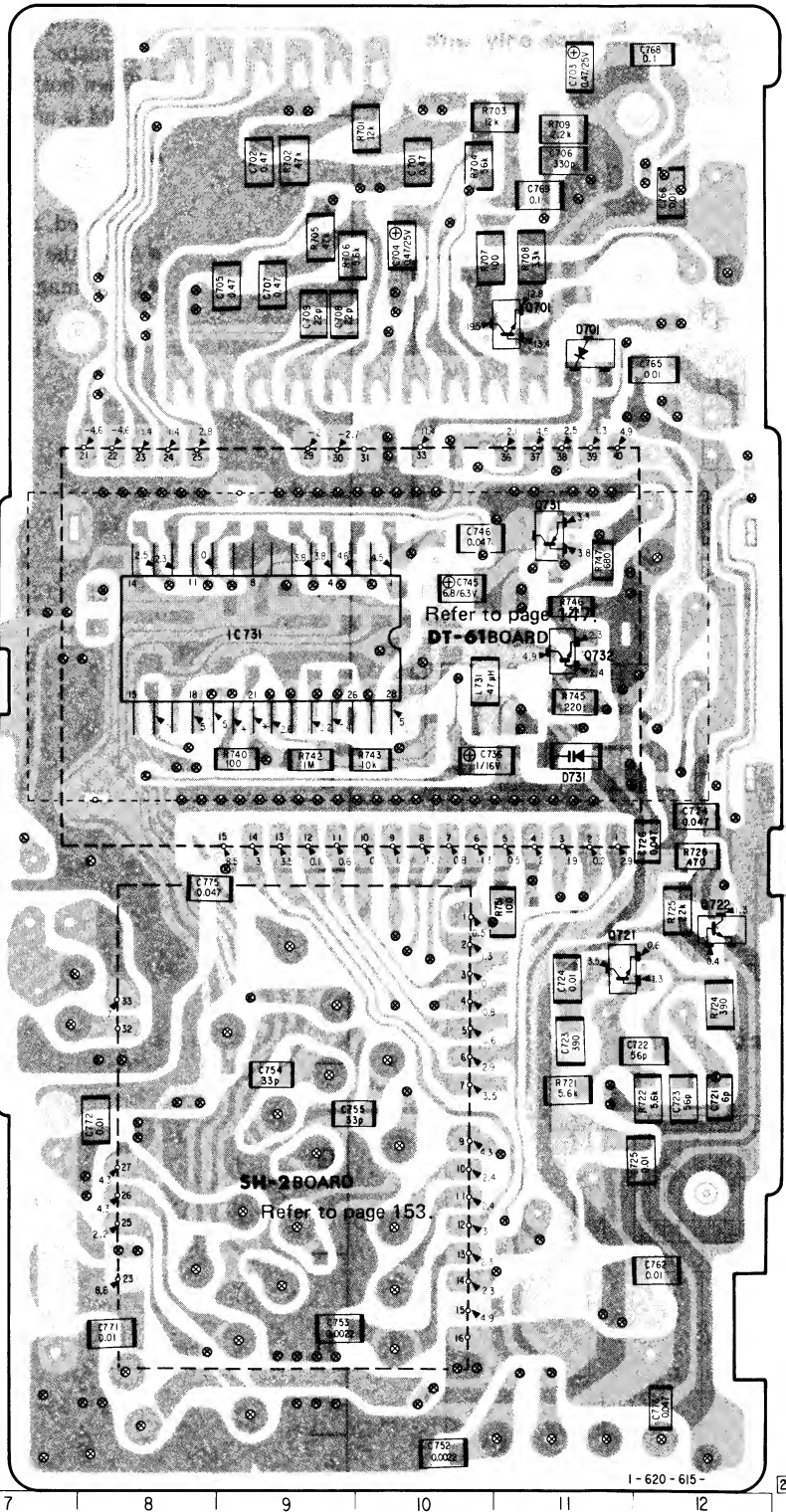


CT721 H-1  
D701 C-11  
IC701 B-4  
IC731 E-9  
  
Q701 C-11  
Q721 G-11  
Q722 G-12  
Q731 D-11  
Q732 E-11  
  
TP751 H-6  
TP752 I-2

VC-20 BOARD (COMPONENT SIDE)

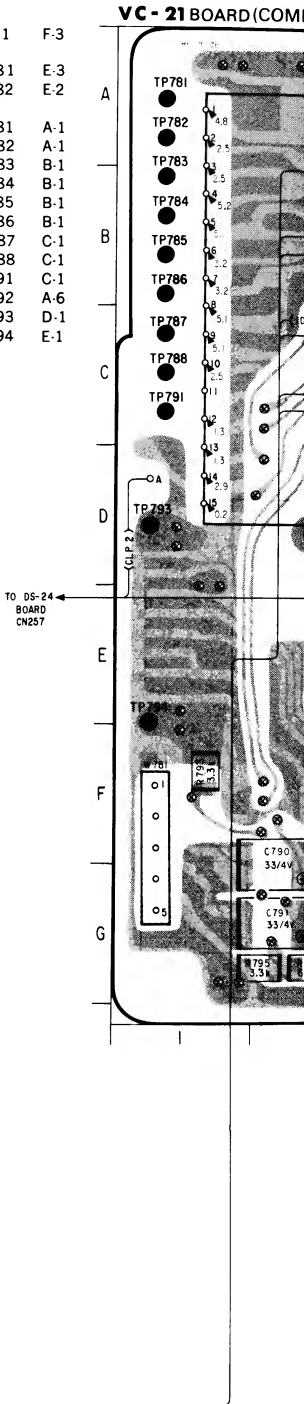


VC-20 BOARD (SOLDER SIDE)



VC-21 BOARD (COMPONENT SIDE)

IC781 F-3  
RV781 E-3  
RV782 E-2  
  
TP781 A-1  
TP782 A-1  
TP783 B-1  
TP784 B-1  
TP785 B-1  
TP786 B-1  
TP787 C-1  
TP788 C-1  
TP791 C-1  
TP792 A-6  
TP793 D-1  
TP794 E-1



Be sure to always read "Note on replacing the CCD imager block" in page 86 when replacing the VC-20 complete board, DT-61 complete board, and CCD imager block (IC701 on the VC-20 board and IC002 on the DT-61 board).



TO DS-24 ←  
BOARD  
CN257

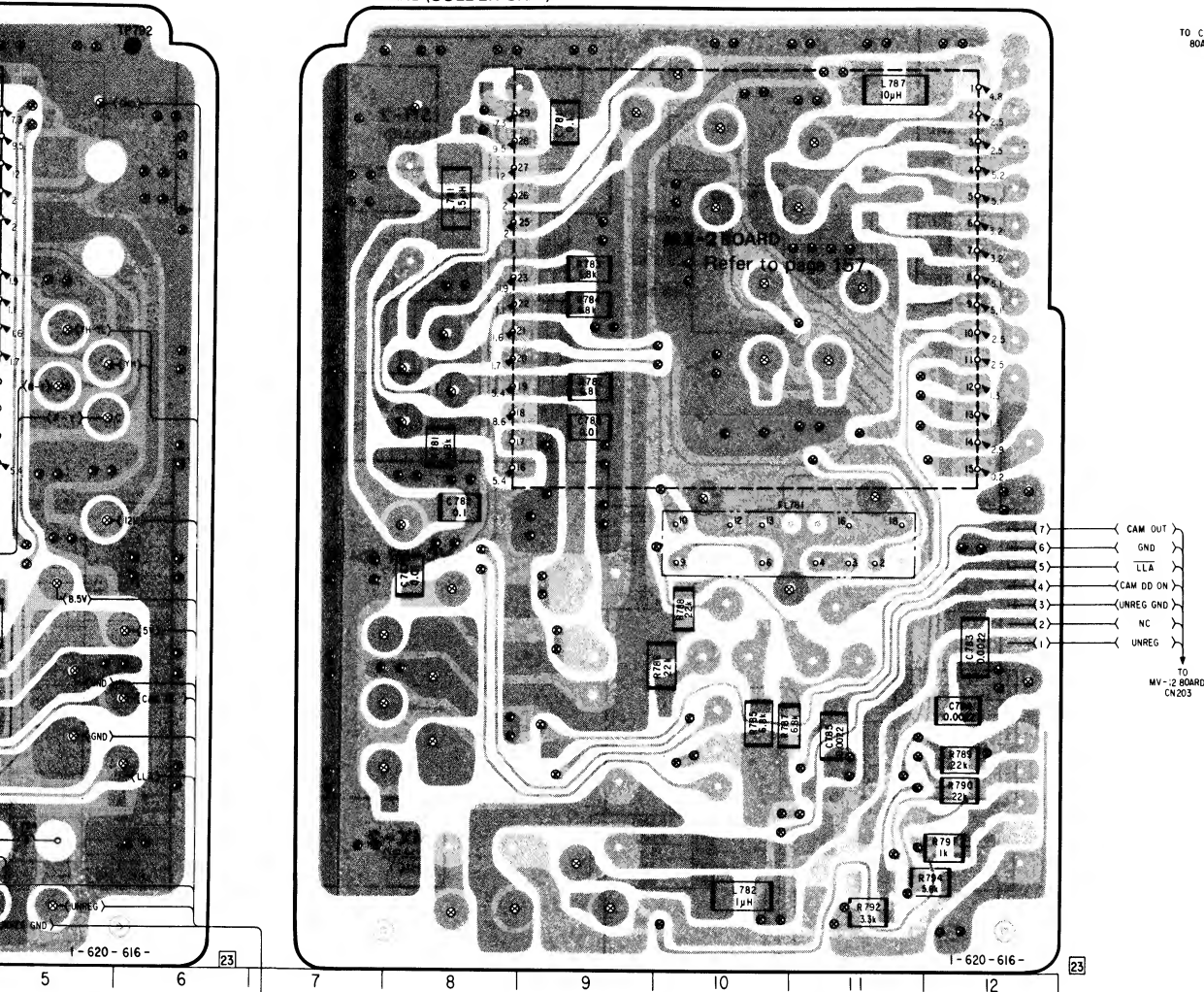
TO CN-  
BOAR

CN203

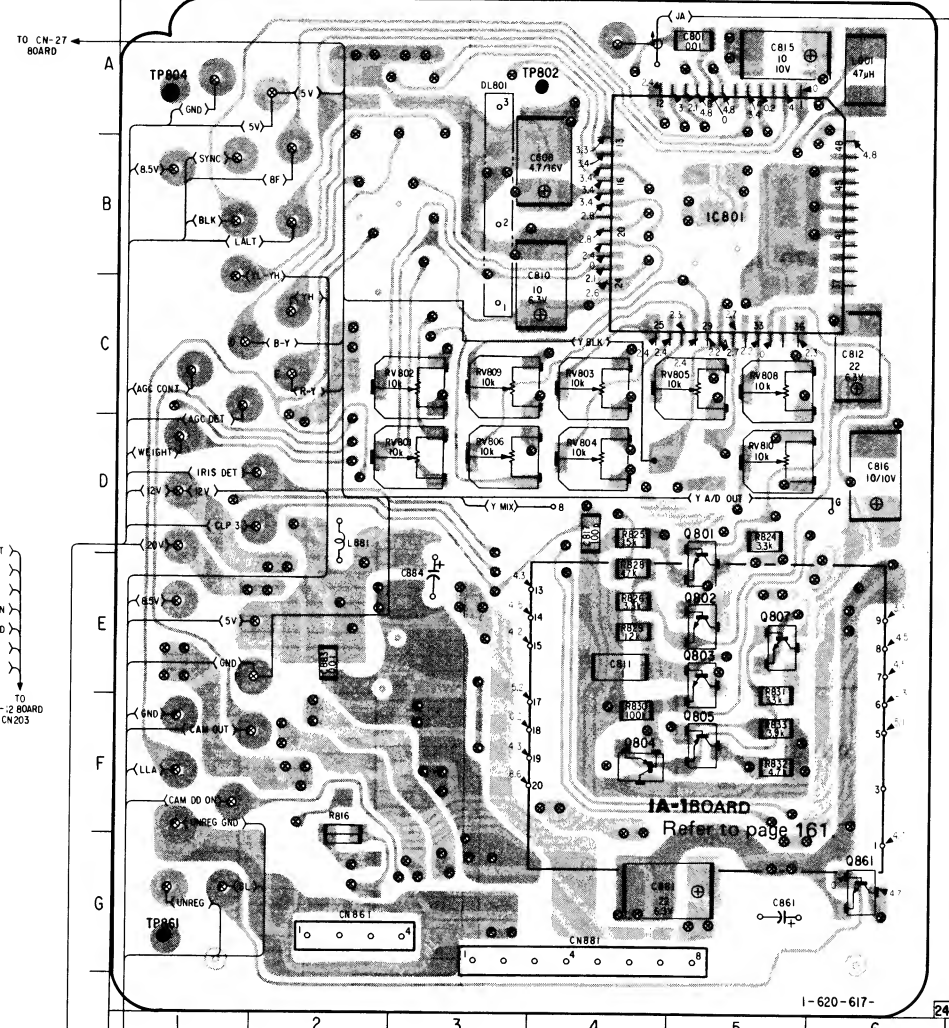
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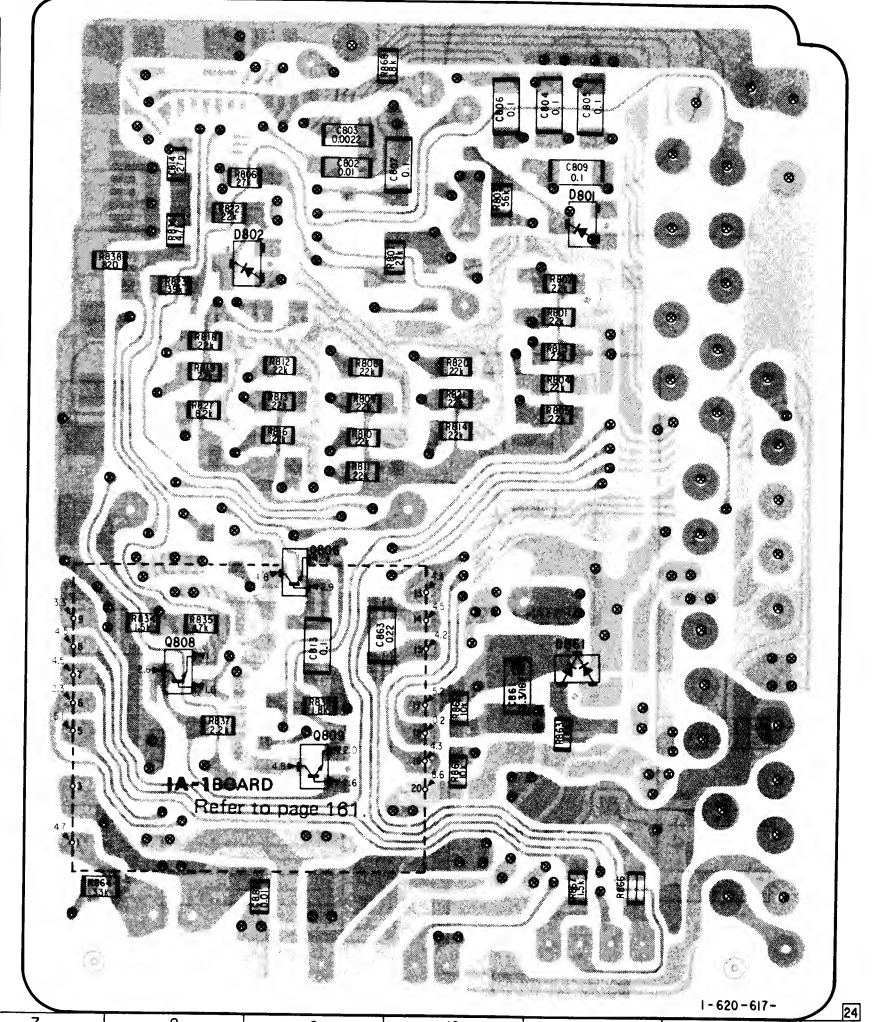
### VC-21 BOARD (SOLDER SIDE)



**VC-22 BOARD (COMPONENT SIDE)**



**VC-22 BOARD(SOLDER SIDE)**



D801	B-11	Q861	G-6
D802	B-8		
D861	E-11	RV801	D-3
		RV802	C-3
IC801	B-5	RV803	C-4
		RV804	D-4
Q801	E-5	RV805	C-5
Q802	E-5	RV806	D-5
Q803	E-5	RV808	C-5
Q804	F-4	RV809	C-3
Q805	F-5	RV810	D-5
Q806	E-9		
Q807	E-5	TP802	A-4
Q808	E-8	TP804	A-1
Q809	F-9	TP81	G-1

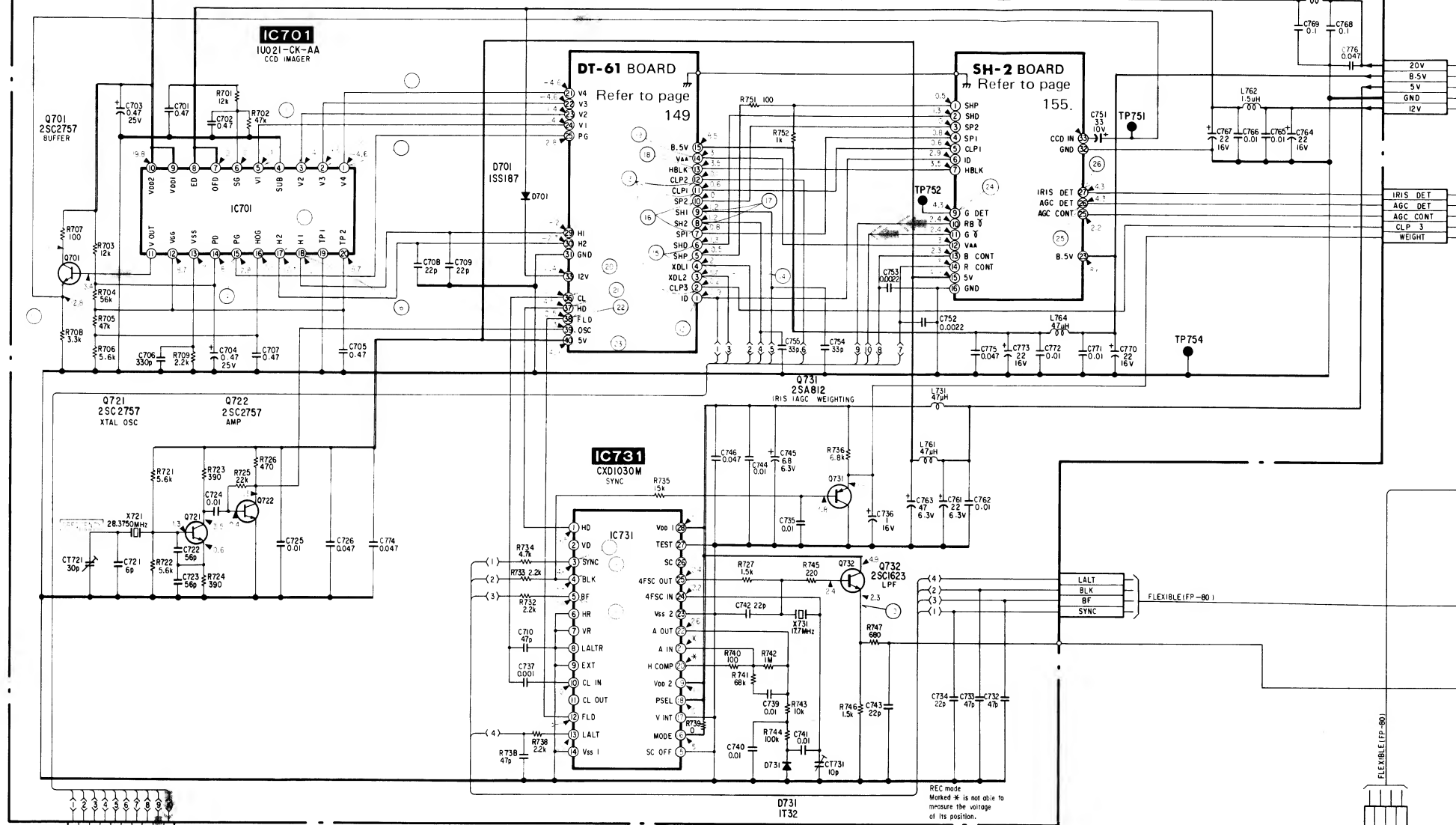
## VC-20(CCD DRIVE, TIMING GENERATOR), VC-21(CAMERA MATRIX), VC-22(CAMERA ENCODER) SCHEMATIC DIAGRAM

—Ref. No. VC-20, VC-21 and VC-22 BOARDS: 1,000 Series—

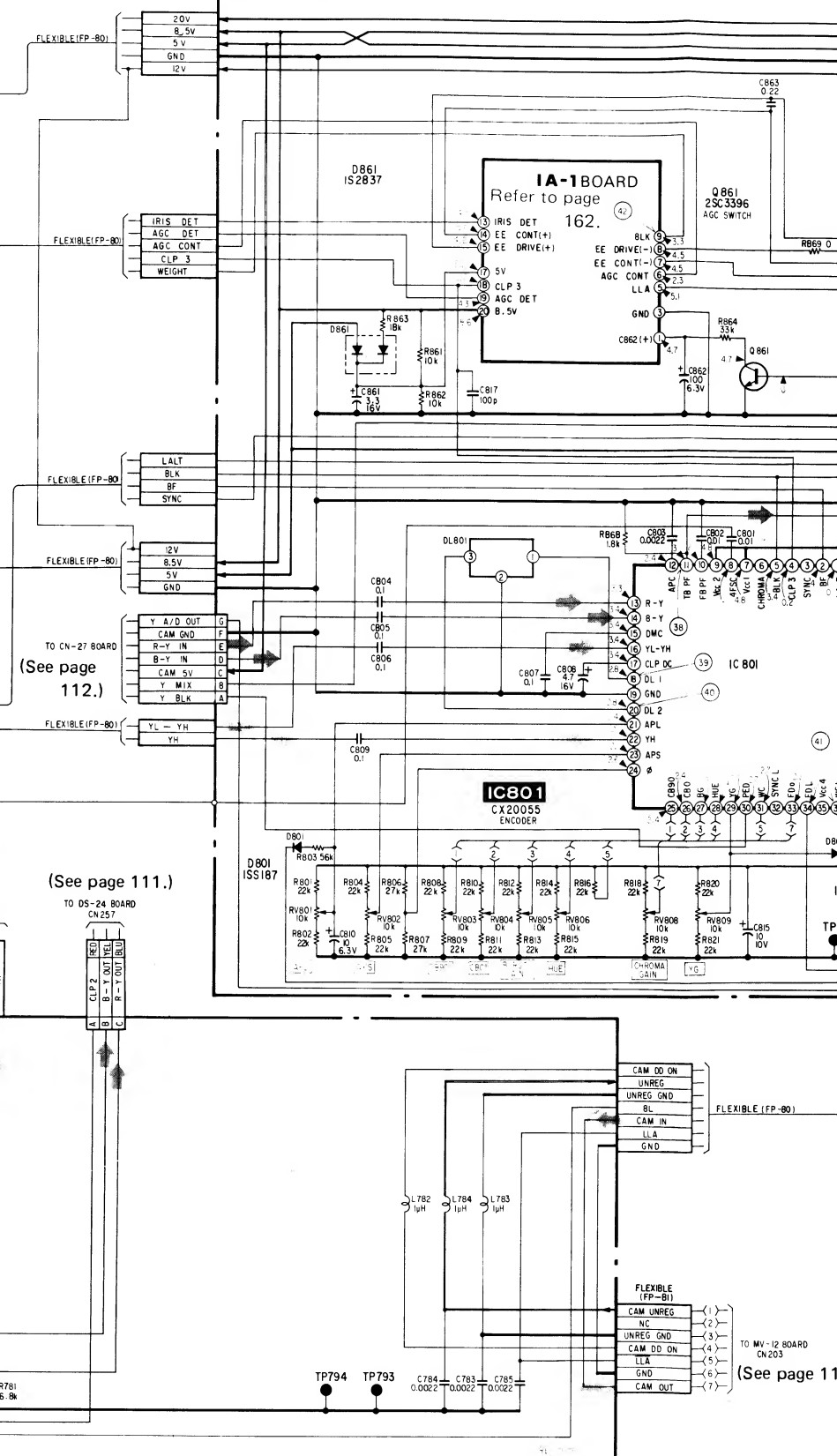
Be sure to always read "Note on replacing the CCD imager block" in page 86 when replacing the VC-20 complete board, DT-61 complete board, and CCD imager block (IC701 on the VC-20 board and IC002 on the DT-61 board).

- Signal path
- ◀ : REC Y Signal
- ▶ : REC CHROMA Signal
- ◀▶ : REC Y/CHROMA Signal

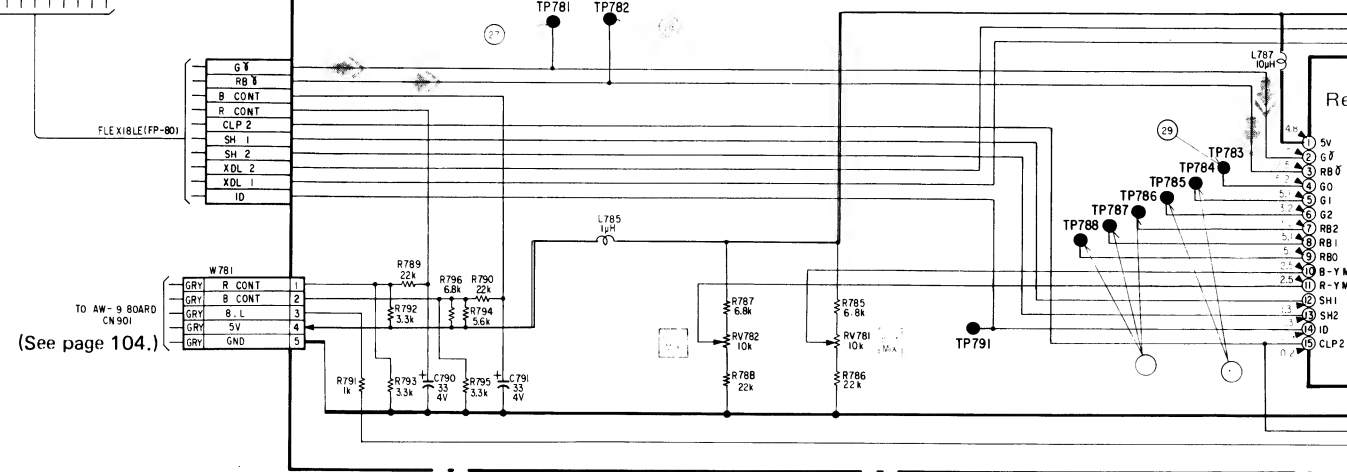
VC-20 BOARD



VC-22 BOARD

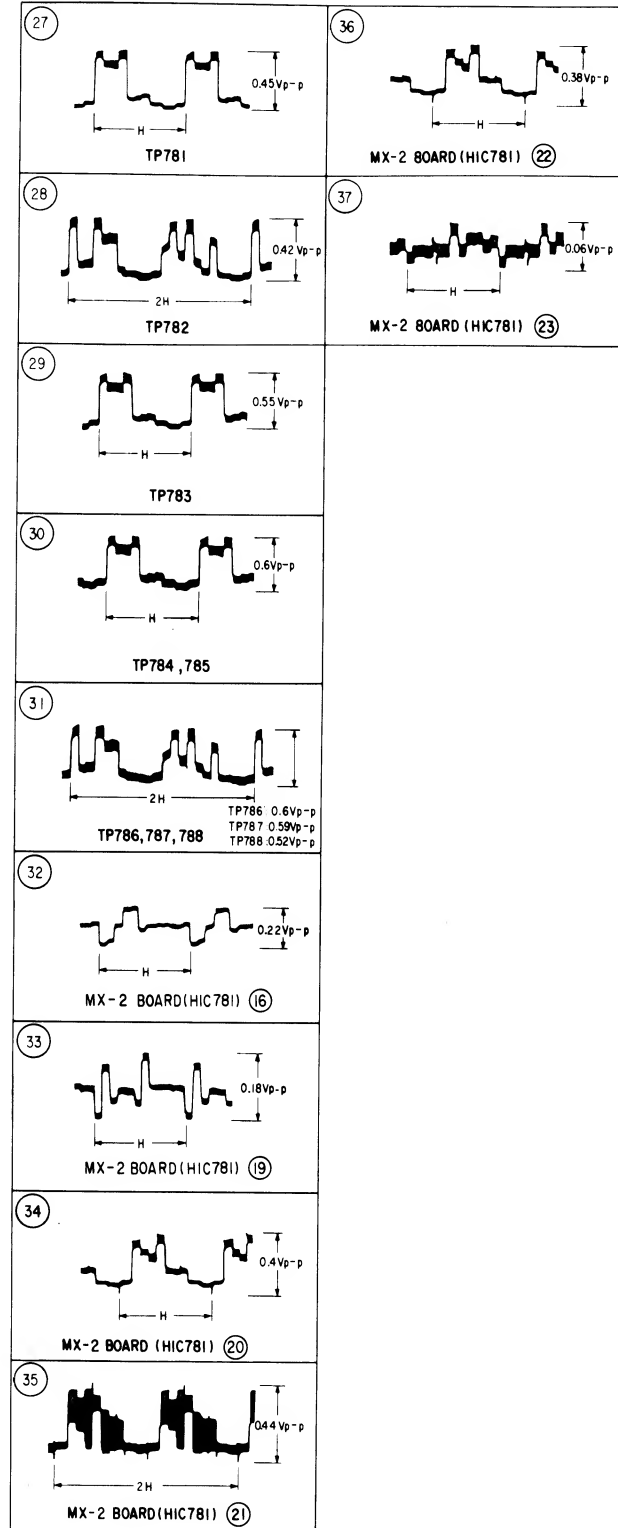


VC-21 BOARD

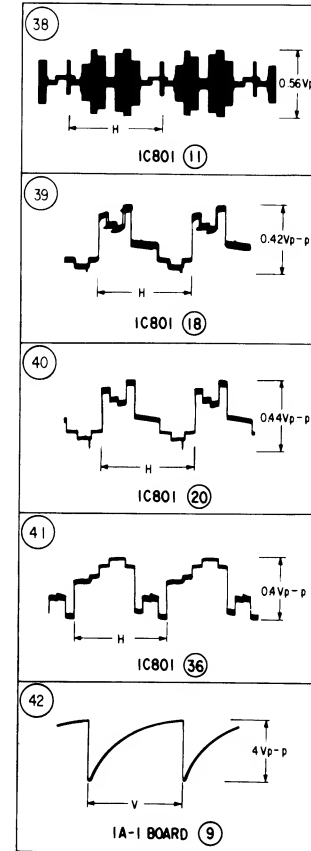




## VC-21 BOARD



## VC-22 BOARD



### Note:

- : indicates a lead wire mounted on the component side.
- : indicates a lead wire mounted on the printed side.
- ⊗ : Through hole.
- ▨ : Pattern from the side which enables seeing.
- ▩ : Pattern of the rear side.
- ▧ : B+ pattern from the side which enables seeing.
- Digital transistor (AW-9: Q901, 902) transistor with resistor.  
Refer to the AW-9 board schematic diagram for digital transistor.

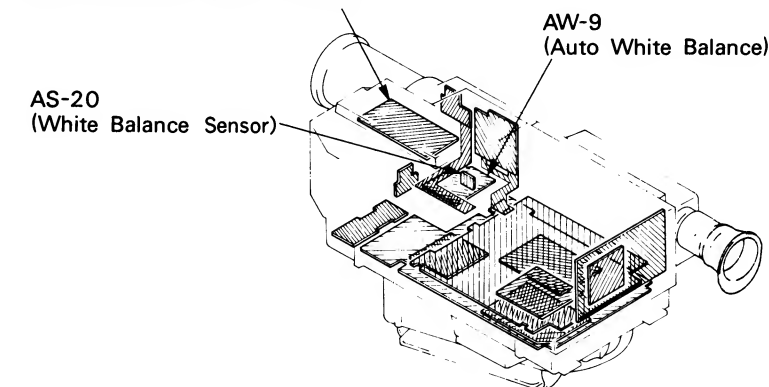
### Caution:

Pattern face side: Parts on the pattern face side seen from (Solder Side) the pattern face are indicated.  
Parts face side: Parts on the parts face side seen from (Component Side) the parts face are indicated.

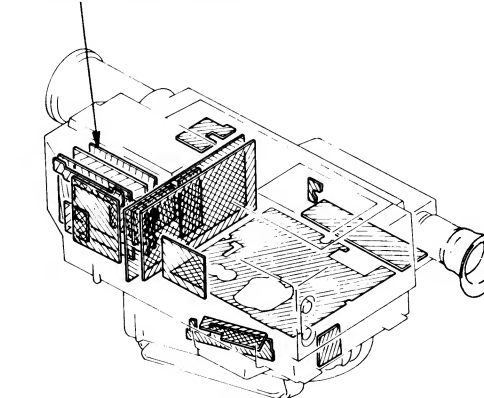
When indicating parts by reference number, please include the board name.

IC1	A-3
IC2	F-3
IC3	B-1
Q1	F-1
Q2	F-2
VR1	B-4
VR2	B-5
VR3	B-2

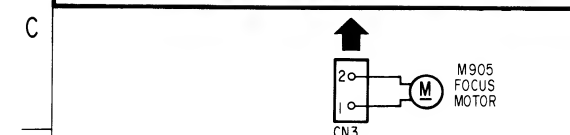
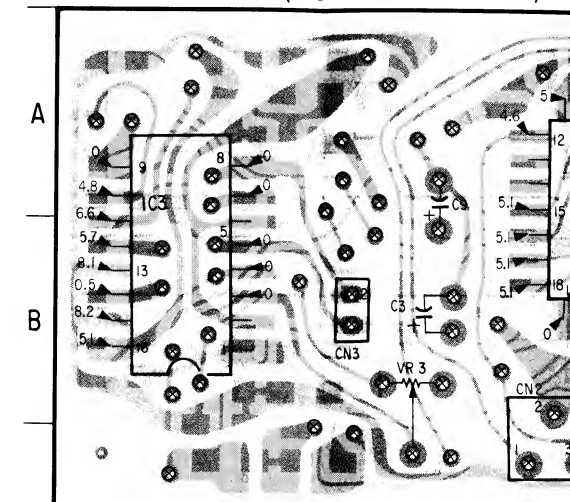
### SW-71 (CAMERA/DATA Function Switch)



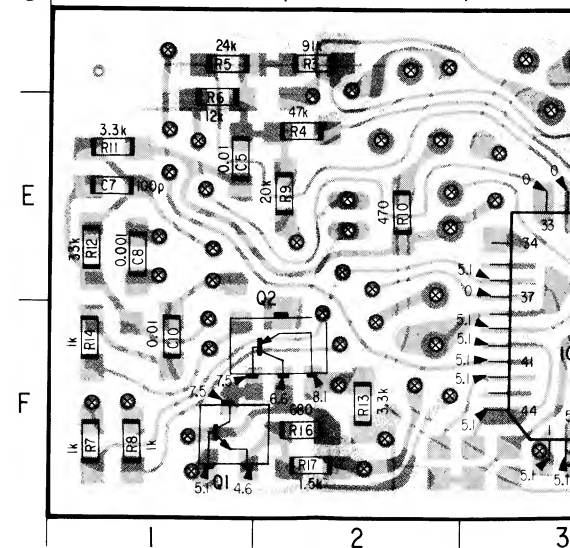
### AF-32 (Auto Focus Control)



## AF-32 BOARD (COMPONENT SIDE)



## AF-32 BOARD (SOLDER SIDE)



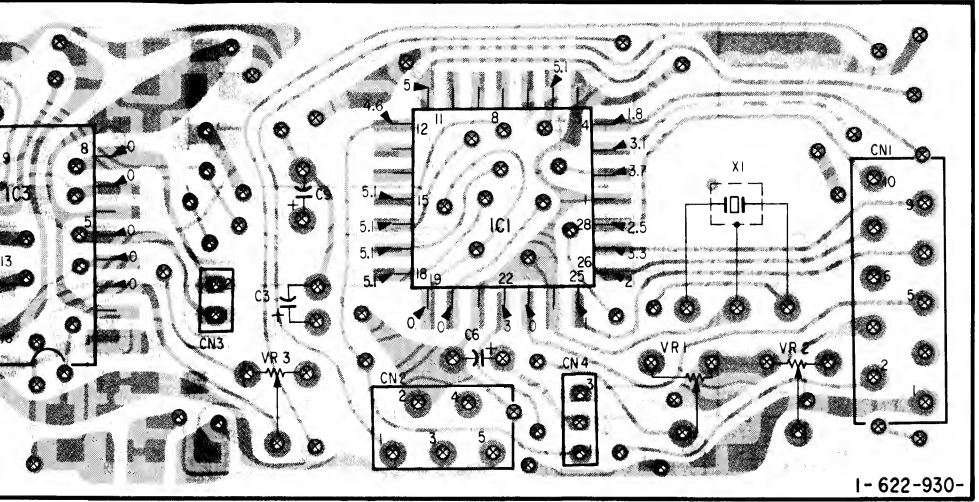


# CAMERA(2) CAMERA(2)

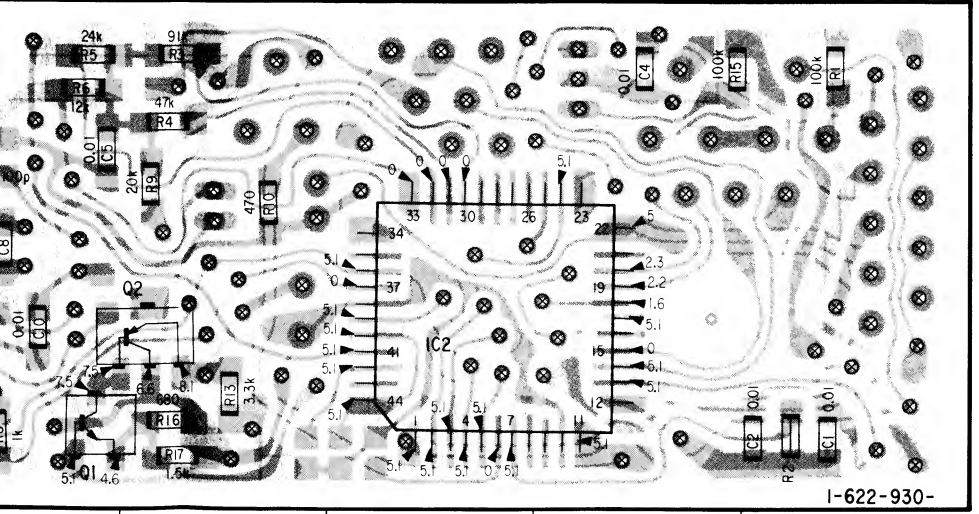
S CONTROL), AW-9(AUTO WHITE BALANCE), SW-71(CAMERA/DATA FUNCTION SWITCH), AS-20(WHITE BALANCE SENSOR) PRINTED WIRING BOARDS

9 and SW-71 BOARDS: 2,000 Series—

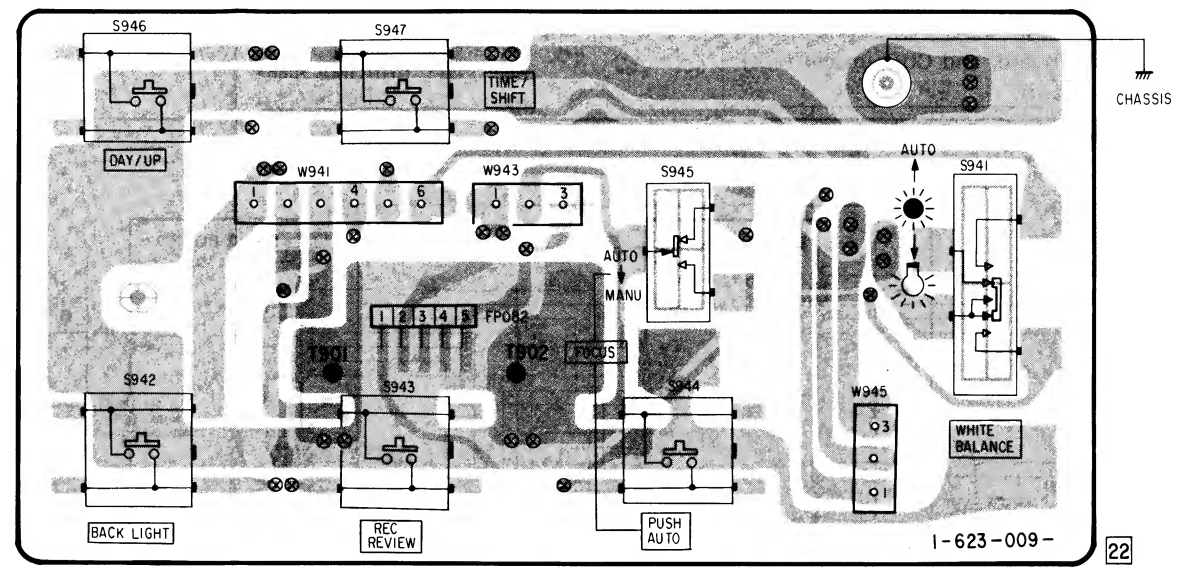
32 BOARD (COMPONENT SIDE)



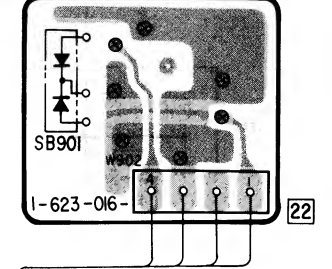
32 BOARD (SOLDER SIDE)



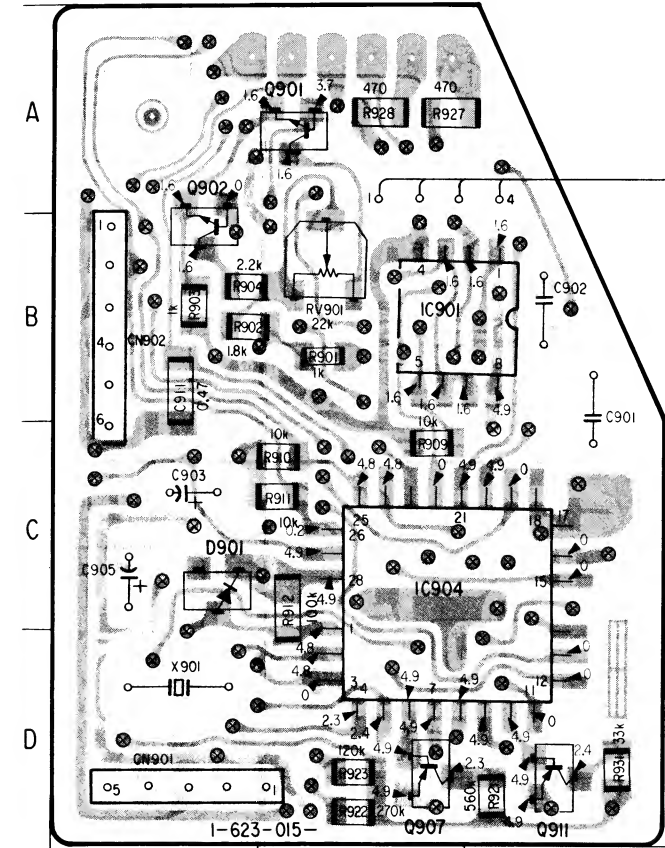
SW - 71 BOARD (COMPONENT SIDE)



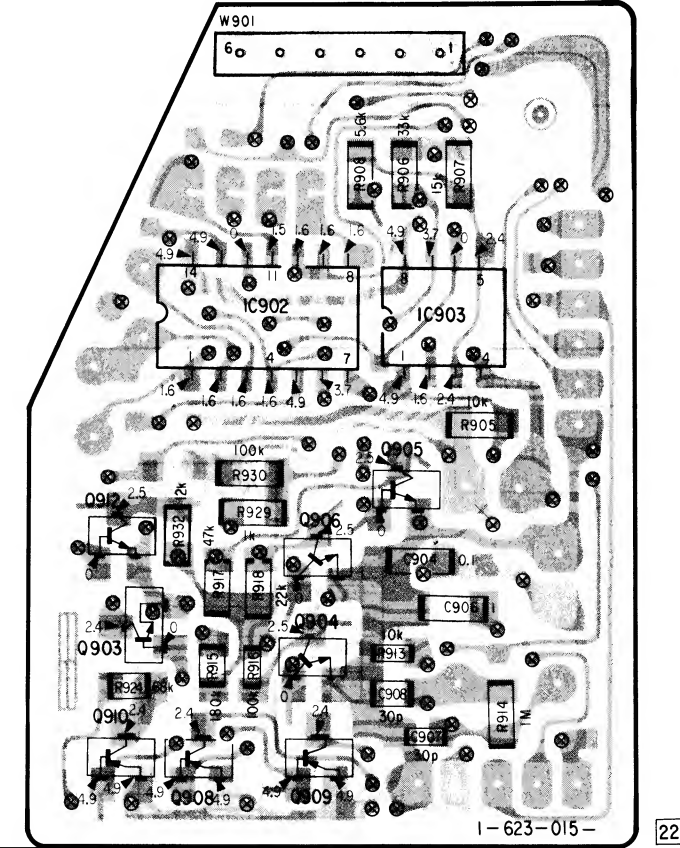
AS-20 BOARD (SOLDER SIDE)



AW - 9 BOARD (COMPONENT SIDE)



AW - 9 BOARD (SOLDER SIDE)

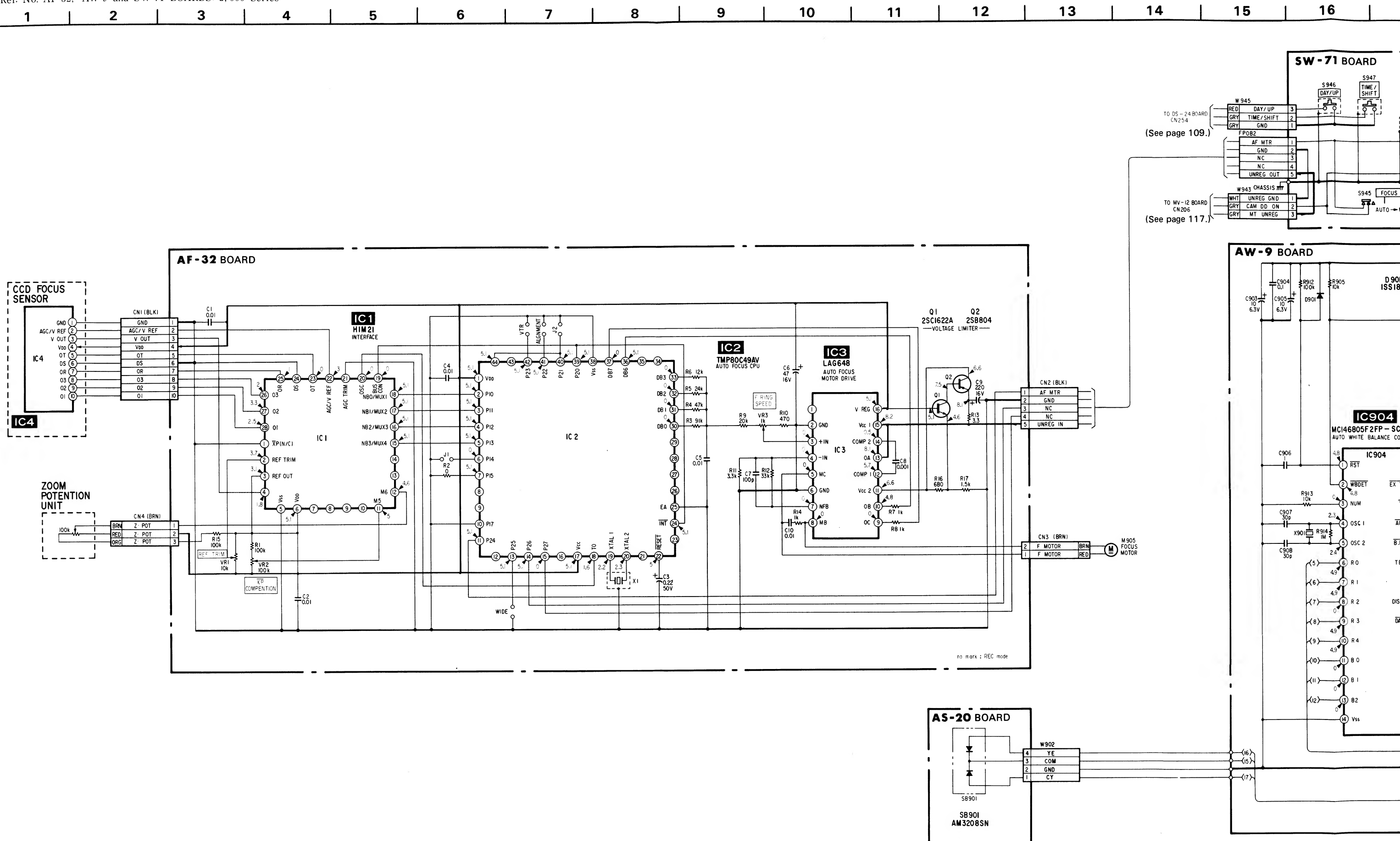


- |       |     |
|-------|-----|
| D901  | C-1 |
| IC901 | B-3 |
| IC902 | B-6 |
| IC903 | B-7 |
| IC904 | C-2 |
| Q901  | A-2 |
| Q902  | B-1 |
| Q903  | D-5 |
| Q904  | D-6 |
| Q905  | C-7 |
| Q906  | C-6 |
| Q907  | D-2 |
| Q908  | D-6 |
| R909  | D-6 |
| Q910  | D-5 |
| Q911  | D-3 |
| Q912  | C-5 |
| RV901 | B-2 |

## CAMERA(2) CAMERA(2)

AF-32(AUTO FOCUS CONTROL), AW-9(AUTO WHITE BALANCE), SW-71(CAMERA/DATA FUNCTION SWITCH), AS-20(WHITE BALANCE SENSOR) SCHEMATIC DIAGRAM

—Ref: No. AF-32, AW-9 and SW-71 BOARDS: 2,000 Series—







DATA DISPLAY, DIGITAL TITLER

DATA DISPLAY, DIGITAL TITLER

DS-24(DATA DISPLAY, DIGITAL TITLER), RZ-1 (ZOOM DRIVER), CN-27(RELAY), SK-21 (DIGITAL TITLER FUNCTION SWITCH),  
—Ref. No. DS-24, CN-27 and SK-21 BOARDS: 3, 000 Series, RZ-1 BOARD : 4, 000 Series—

- Note:**
- — : indicates a lead wire mounted on the component side.
  - — : indicates a lead wire mounted on the printed side.
  - ⊗ : Through hole.
  - : Pattern from the side which enables seeing.
  - : Pattern of the rear side.
  - ⬆ : B+ pattern from the side which enables seeing.
  - Digital transistor (DS-24: Q113, Q114, Q116, Q117, RZ-1: Q119, Q121, Q123) transistor with resistor.  
Refer to the DS-24 and RZ-1 boards schematic diagram for digital transistor.

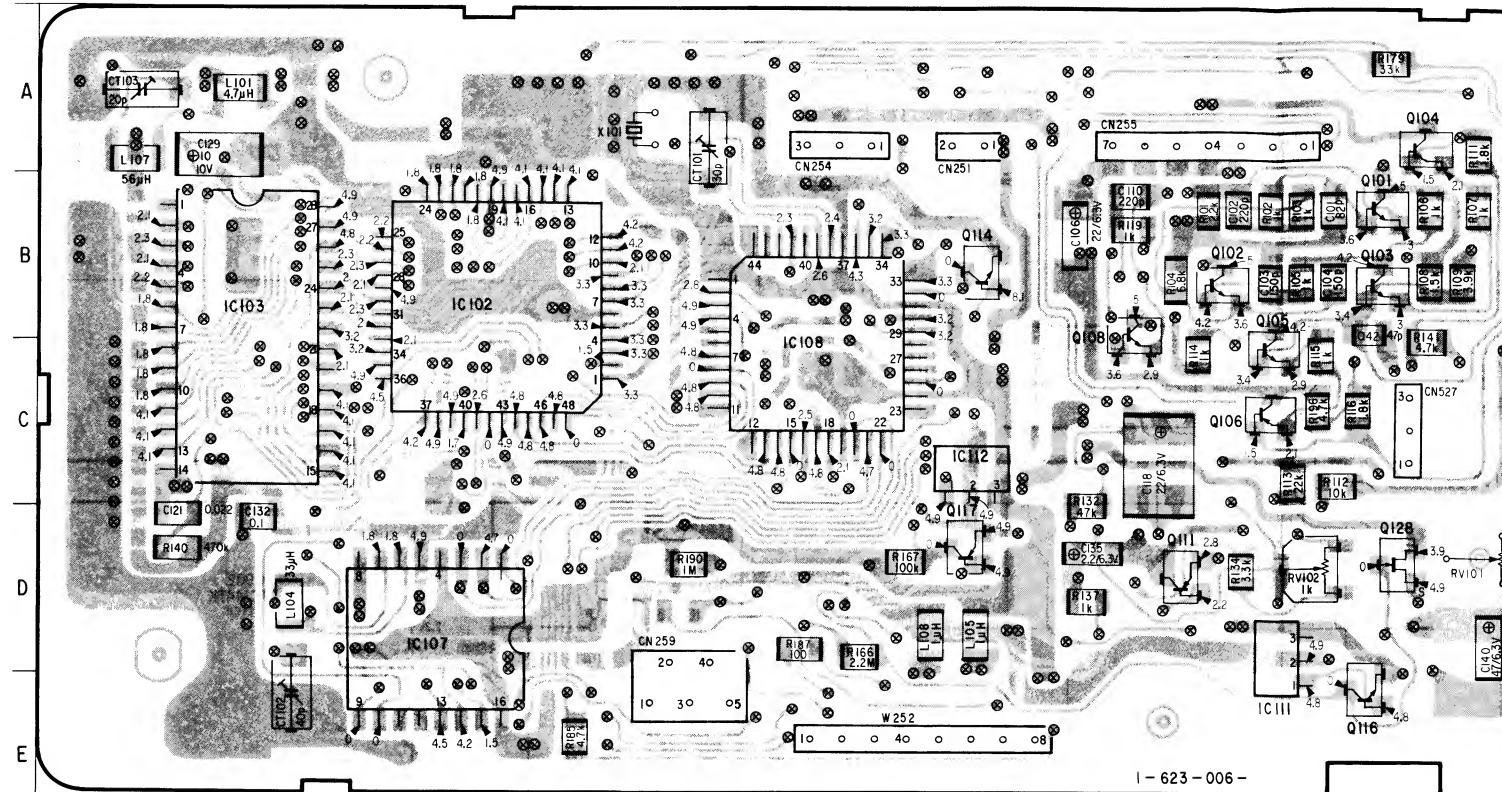
**Caution:**  
Pattern face side: Parts on the pattern face side seen from (Solder Side) the pattern face are indicated.  
Parts face side: Parts on the parts face side seen from (Component Side) the parts face are indicated.

Measure the voltage and waveform of the DS-24 board by superimposing and turning the screen totally white.

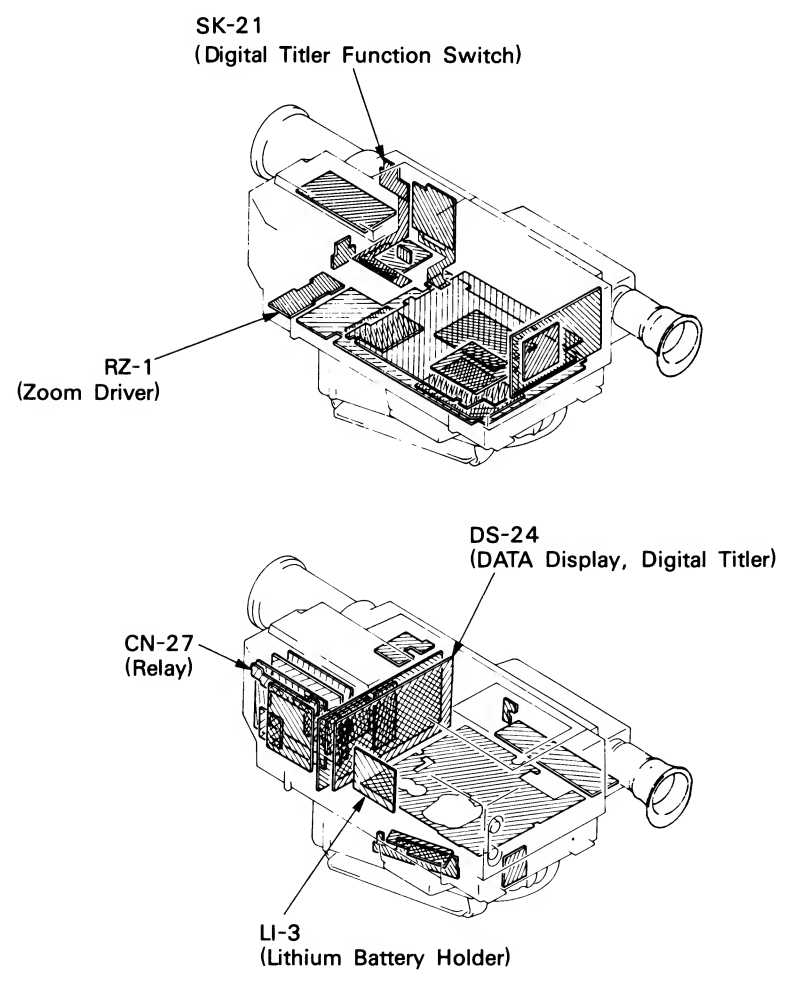
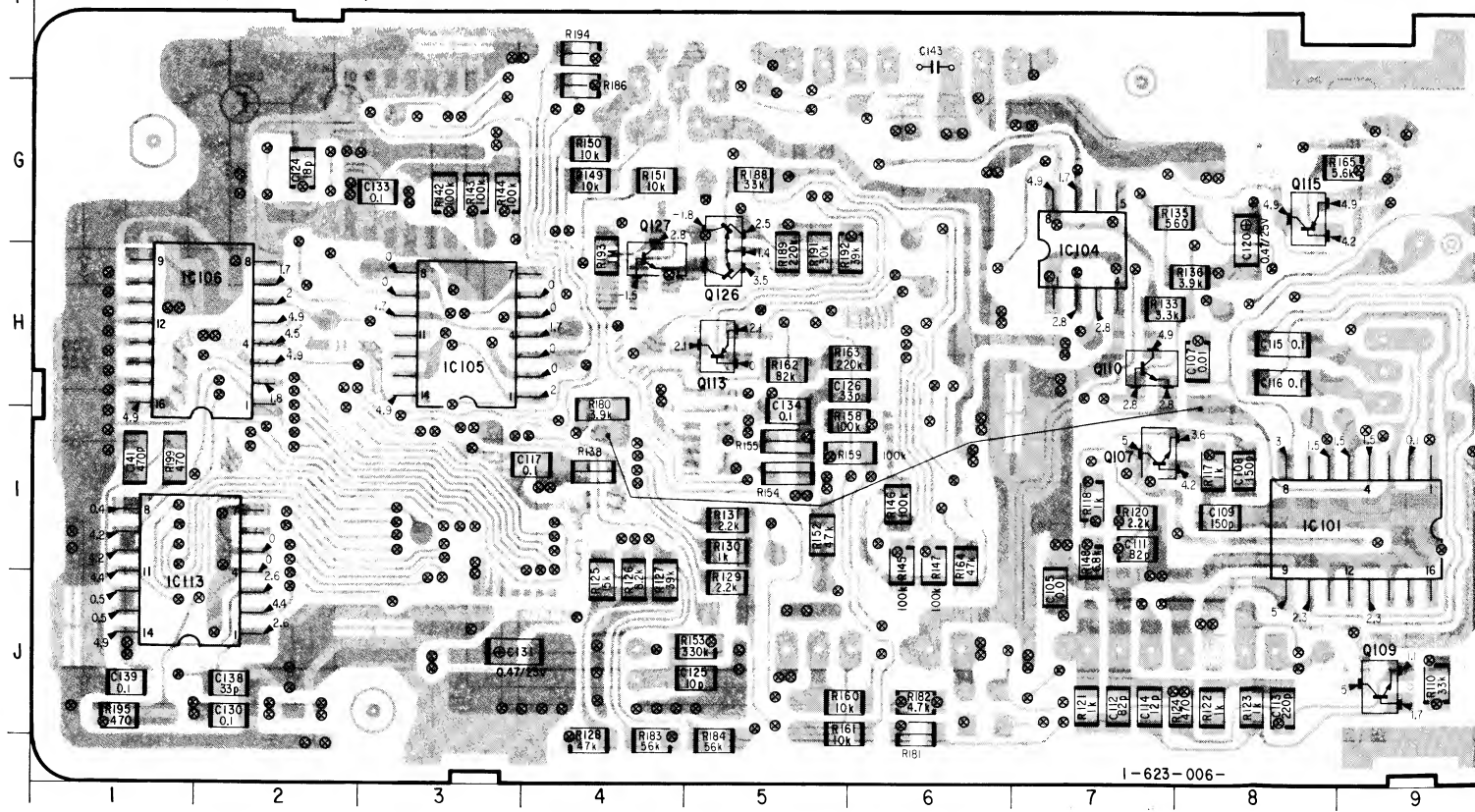
When indicating parts by reference number, please include the board name.

- |       |     |
|-------|-----|
| CT101 | A-5 |
| CT102 | E-2 |
| CT103 | A-1 |
| IC101 | I-9 |
| IC102 | B-3 |
| IC103 | B-2 |
| IC104 | G-7 |
| IC105 | H-3 |
| IC106 | H-1 |
| IC107 | D-3 |
| IC108 | B-5 |
| IC111 | D-8 |
| IC112 | C-6 |
| IC113 | I-1 |
| Q101  | B-9 |
| Q102  | B-8 |
| Q103  | B-9 |
| Q104  | A-9 |
| Q105  | B-8 |
| Q106  | C-8 |
| Q107  | I-7 |
| Q108  | B-7 |
| Q109  | J-9 |
| Q110  | H-7 |
| Q111  | D-7 |
| Q113  | H-5 |
| Q114  | B-6 |
| Q115  | G-8 |
| Q116  | D-9 |
| Q117  | D-6 |
| Q126  | G-5 |
| Q127  | H-4 |
| Q128  | D-9 |
| RV101 | D-9 |
| RV102 | D-8 |

DS-24 BOARD (COMPONENT SIDE)

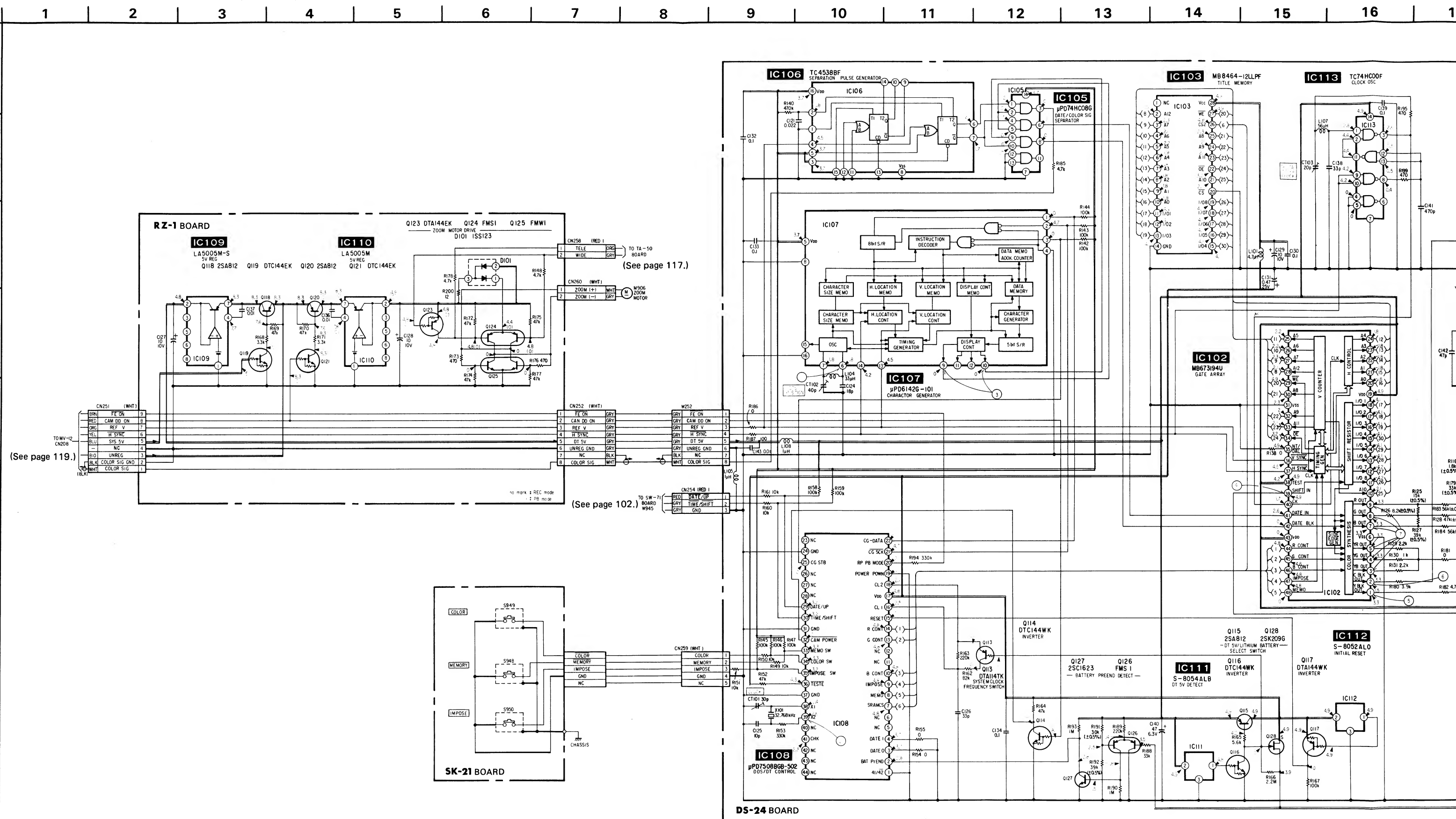


DS-24 BOARD (SOLDER SIDE)

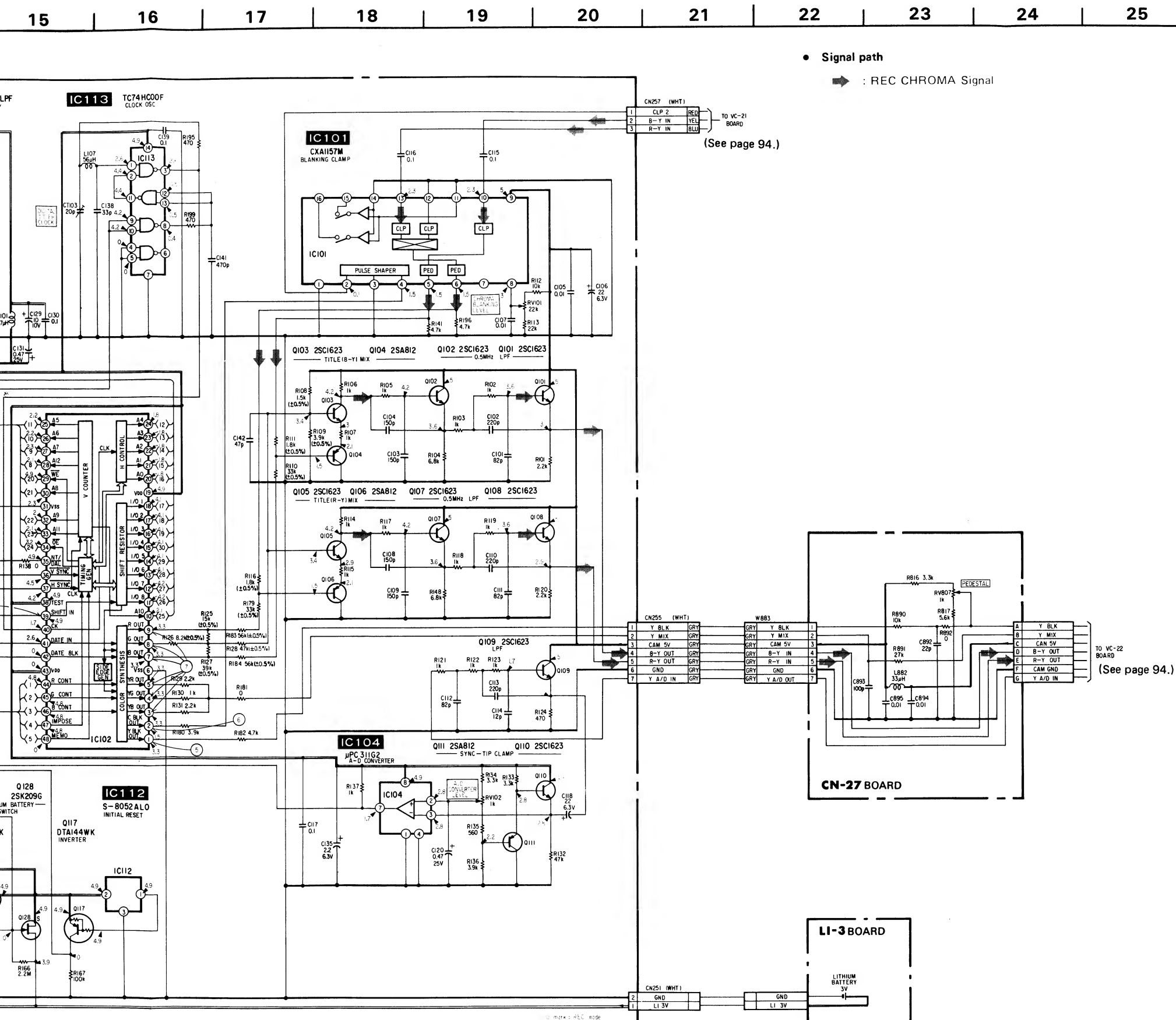




—Ref. No. DS-24, CN-27 and SK-21 BOARDS: 3,000 Series, RZ-1 BOARD: 4,000 Series—







## Note:

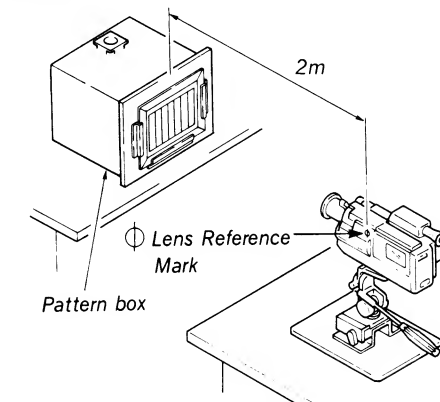
- Caution when replacing chip parts.  
New parts must be attached after removal of chip.  
Be careful not to heat the minus side of tantalum capacitor, because it is damaged by the head.
- All resistors are in ohms, 1/10W unless otherwise noted.
- All capacitors are in  $\mu\text{F}$  (p:pF) unless otherwise noted.  
50V or less are not indicated except for electrolytic capacitors.
- All variable and semi fixed resistors have characteristic curve B, unless otherwise noted.

- : panel designation.
- : Nonflammable resistor
- : B+ bus.
- : adjustment for repair.

- Measure the voltage and waveform of the DS-24 board by superimposing and turning the screen totally white.

- Voltage and waveform measuring conditions:  
 (1) Sample object: Pattern box colour bars.  
 (2) Voltage values: Relative to ground, measured with a DC digital multimeter (impedance 10M-ohm or more).

## 1. Connection



- 2. Adjust the zooming of camera and the tripod so that the output waveform of Fig. a and the picture of Fig. b can be obtain.

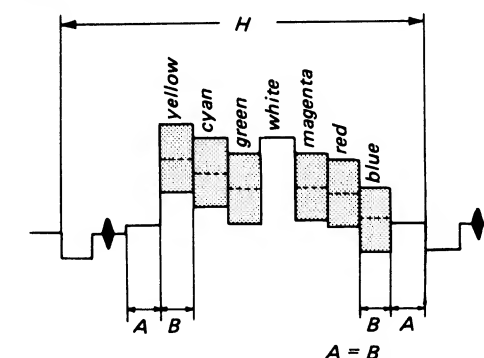


Fig. a Camera output waveform of No. ⑦ terminal of FP-81 flexible board.

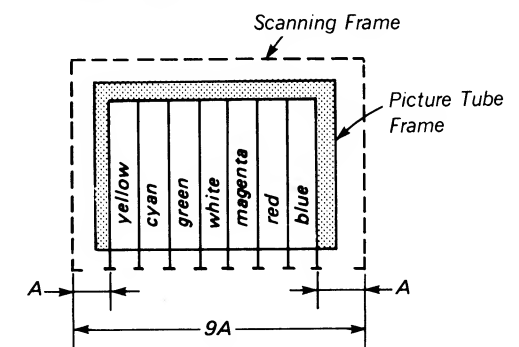
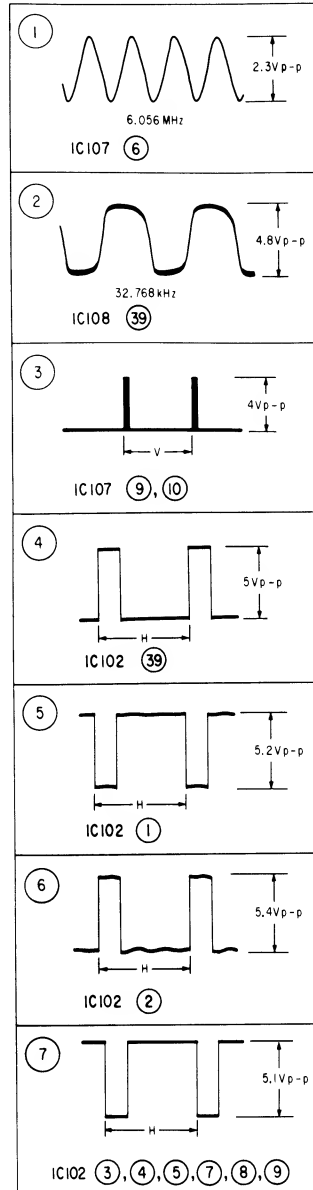


Fig. b Picture of TV monitor screen

## DS - 24 BOARD



# VIDEO, POWER VIDEO, POWER

MV-12(VIDEO SIGNAL PROCESS), MR-8(REC/PB AMP), TA-50(RELAY TERMINAL), RC-21(START/STOP CAMERA ON SWITCH), FH-14(POWER), FP-49(OUTPUT JACK)

—Ref. No. MV-12, MR-8, TA-50, RC-21, FH-14 and FP-49 BOARDS : 5,000 series—

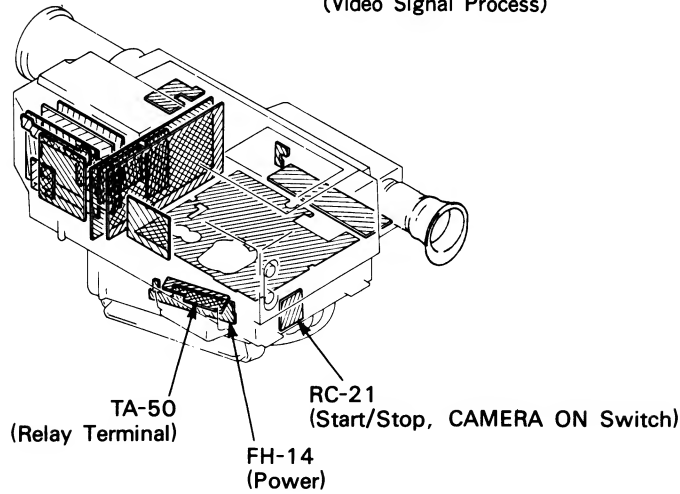
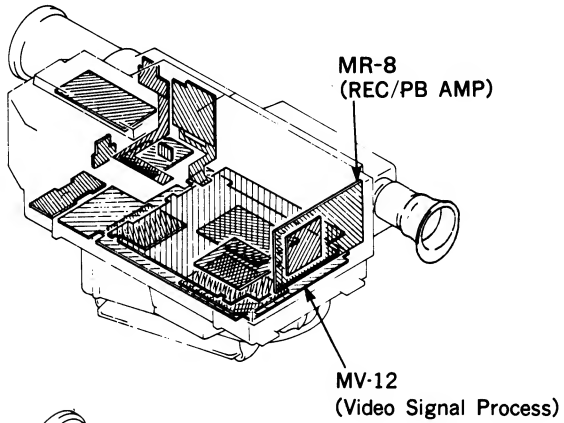
### Note:

- — : indicates a lead wire mounted on the component side.
- — : indicates a lead wire mounted on the printed side.
- ⊗ : Through hole.
- : Pattern from the side which enables seeing.
- : Pattern of the rear side.
- : B+ pattern from the side which enables seeing.
- Digital transistor (MR-8: Q151) transistor with resistor.  
Refer to the MR-8 board schematic diagram for digital transistor.

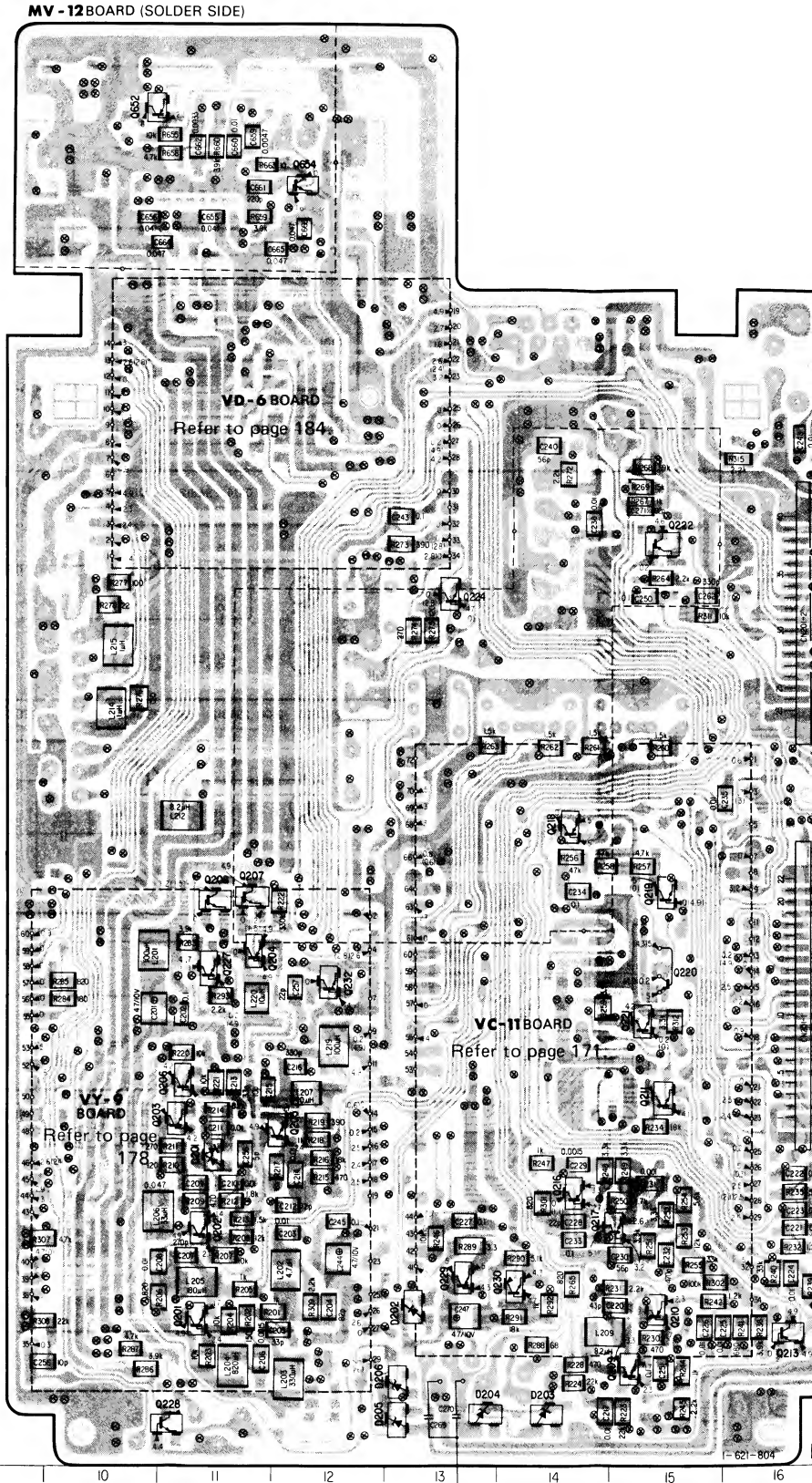
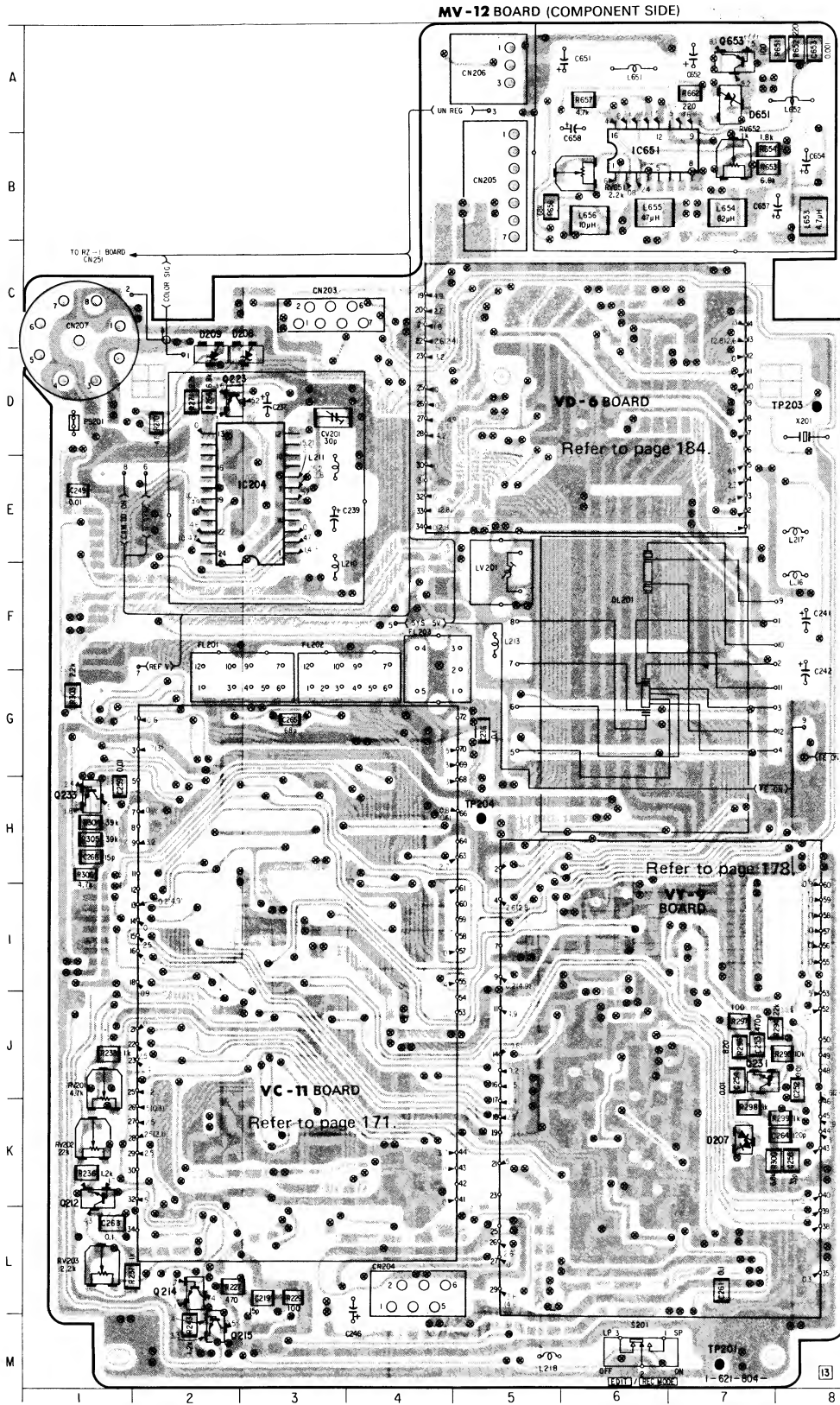
### Caution:

Pattern face side: Parts on the pattern face side seen from (Solder Side) the pattern face are indicated.  
Parts face side: Parts on the parts face side seen from (Component Side) the parts face are indicated.

When indicating parts by reference number, please include the board name.

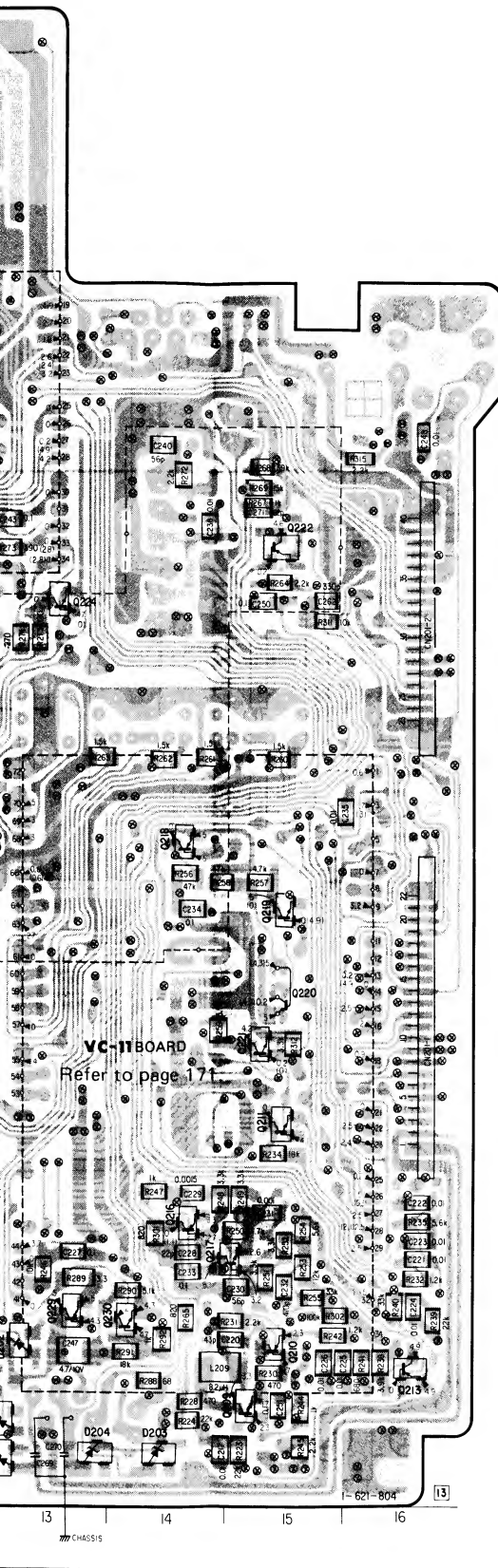


CV201	D-3
D201	J-11
D202	L-13
D203	M-14
D204	M-13
D205	M-13
D206	L-13
D207	K-7
D208	D-2
D209	D-2
D651	A-7
IC204	E-3
IC651	B-6
LV201	F-5
Q201	L-11
Q202	K-11
Q203	J-11
Q204	I-11
Q205	J-12
Q206	J-11
Q207	H-11
Q208	H-11
Q209	L-15
Q210	L-15
Q211	J-15
Q212	K-1
Q213	L-16
Q214	L-2
Q215	M-2
Q216	K-14
Q217	K-15
Q218	H-14
Q219	H-15
Q220	I-15
Q221	I-15
Q222	E-15
Q223	D-2
Q224	F-13
Q227	I-11
Q228	M-11
Q229	L-13
Q230	L-14
Q231	J-7
Q232	I-12
Q233	H-1
Q652	A-10
Q653	A-7
Q654	B-12
RV201	J-1
RV202	K-1
RV203	L-1
RV651	B-6
RV652	B-7
TP201	M-7
TP203	D-8
TP204	H-5



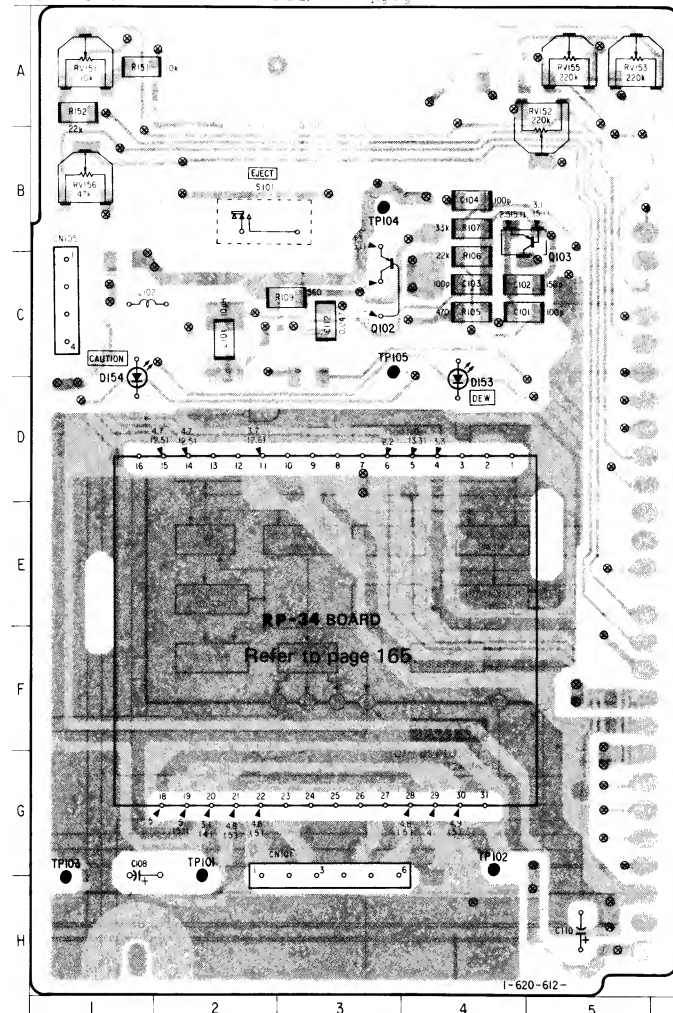


FH-14(POWER), FP-49(OUTPUT JACK)PRINTED WIRING BOARDS

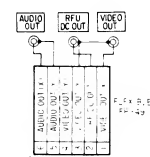
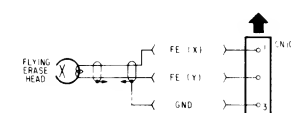
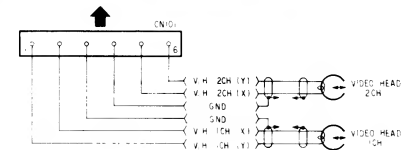
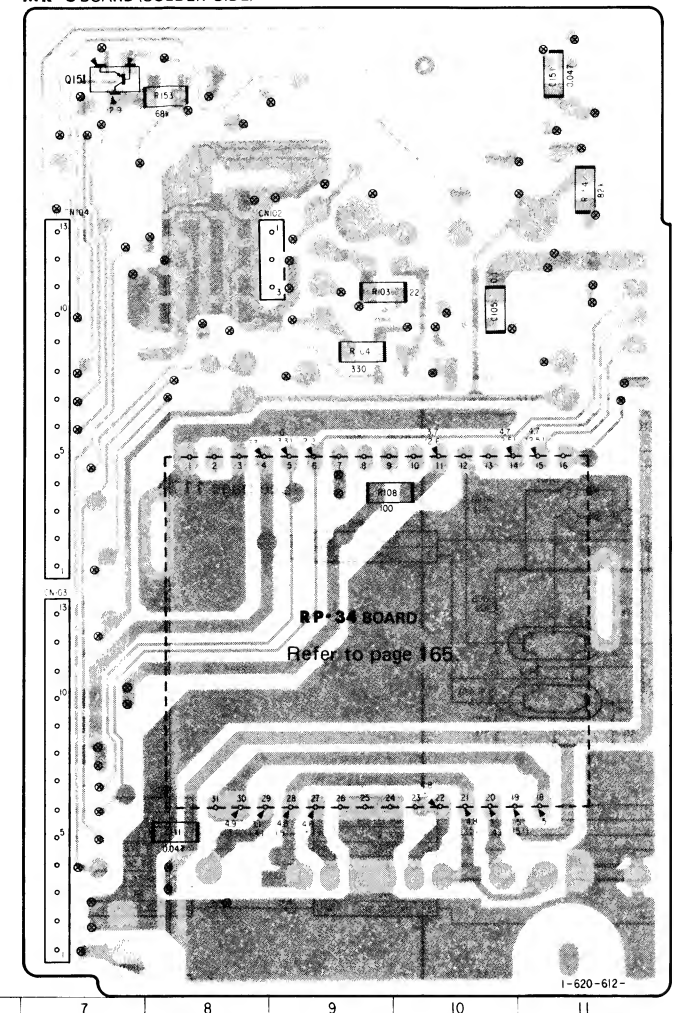


D153 D-4  
D154 D-1  
Q101 C-10  
Q102 C-3  
Q103 B-5  
Q151 A-7  
RV151 A-1  
RV152 A-5  
RV153 A-5  
RV155 A-5  
RV156 B-1  
TP101 H-2  
TP102 G-4  
TP103 H-1  
TP104 B-3  
TP105 C-3

MR-8 BOARD (COMPONENT SIDE)

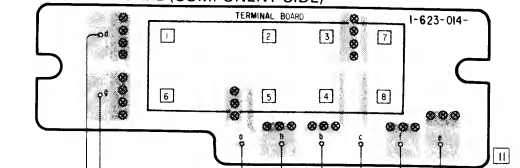


MR-8 BOARD (SOLDER SIDE)

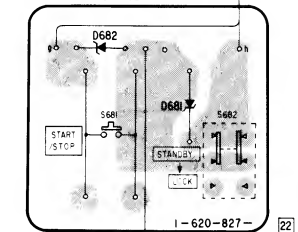


GRIP

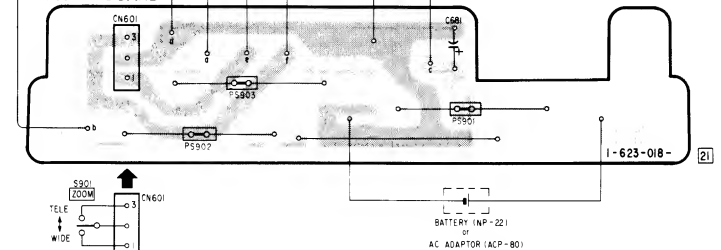
TA-50 BOARD (COMPONENT SIDE)



RC-21 BOARD



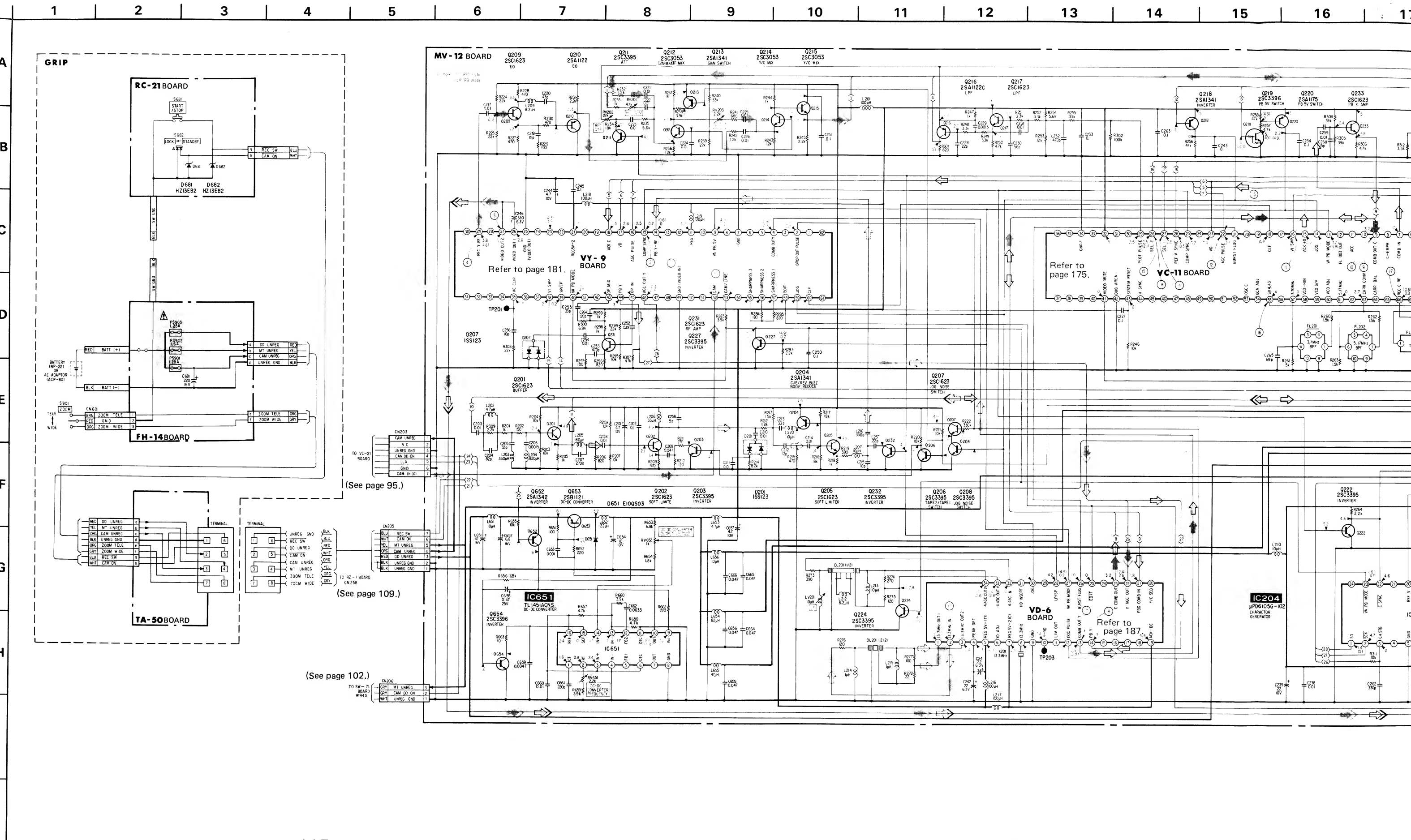
FH-14 BOARD

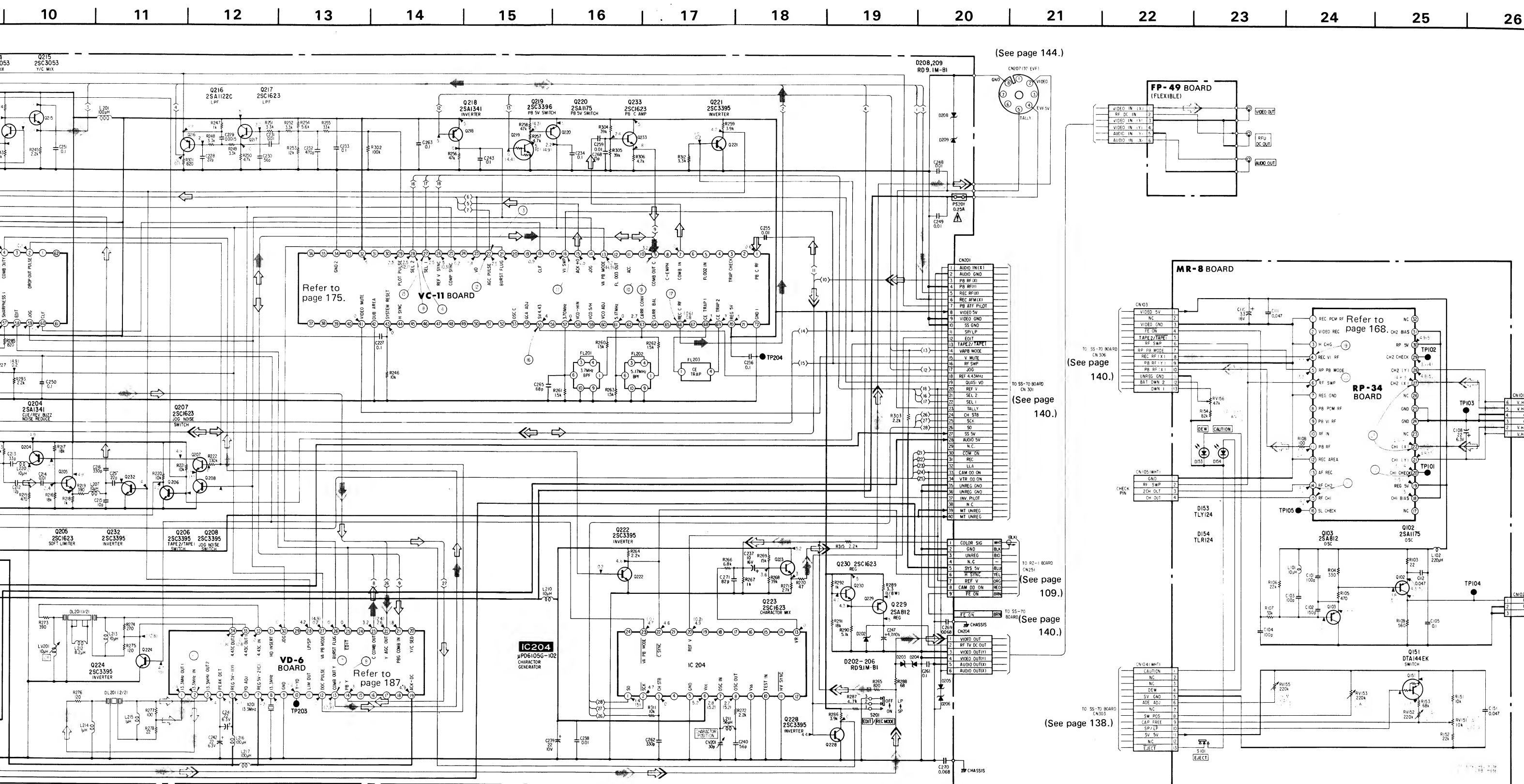


# VIDEO, POWER VIDEO, POWER





MV-12 (VIDEO SIGNAL PROCESS), MR-8(REC/PB AMP), TA-50(RELAY TERMINAL), RC-21(START/STOP CAMERA ON SWITCH), FH-14(POWER), FP-49(OUTPUT JACK) SCHEMATIC DIAGRAM

—Ref. No. MV-12, MR-8, TA-50, RC-21, FH-14 and FP-49 BOARDS : 5,000 series—





- **Signal path**

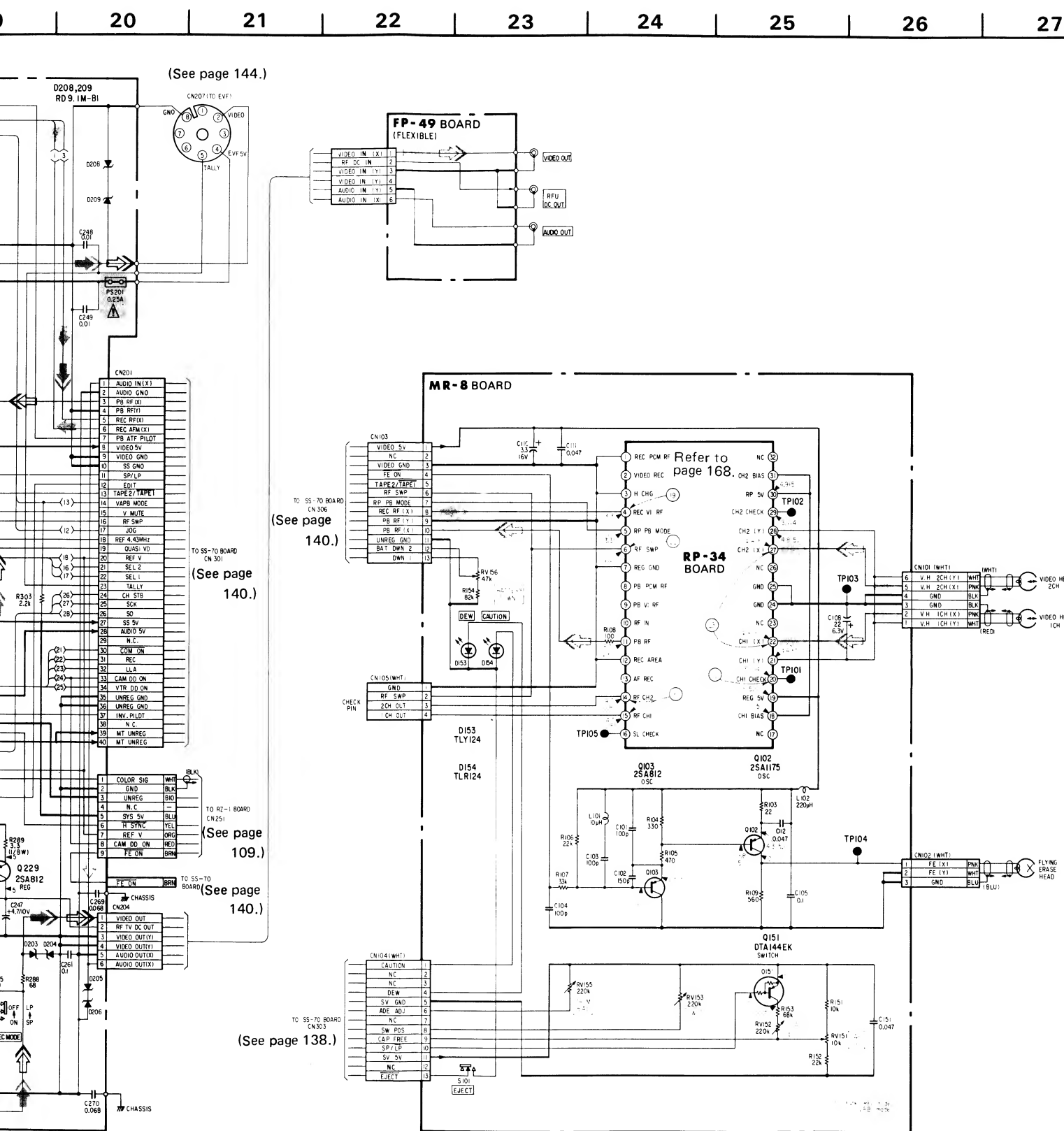
-  REC Y Signal
-  PB Y Signal
-  : REC CHROMA Signal
-  : PB CHROMA Signal

- REC Y-CHROMA Signal  
PB Y-CHROMA Signal







**Note:** The components identified by  are critical for safety. Replace with the part number specified.

When indicating parts by reference number, please include the board name.





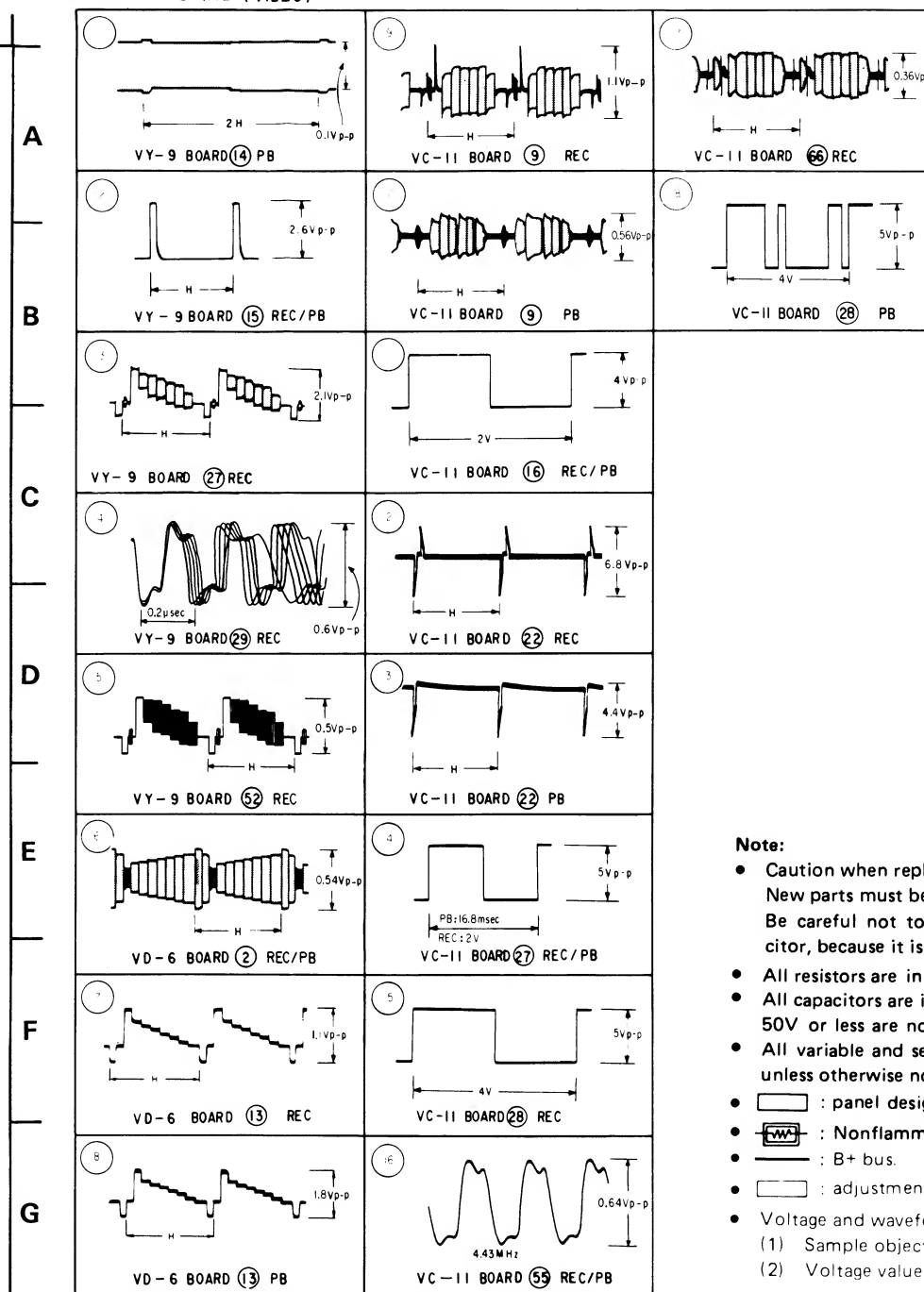
- **Signal path**

-  : REC Y Signal       : REC Y-CHROMA Signal  
 : PB Y Signal       : PB Y-CHROMA Signal  
 : REC CHROMA Signal  
 : PB CHROMA Signal





**Note:** The components identified by shading and mark  are critical for safety. Replace only with part number specified.

When indicating parts by reference number, please include the board name.

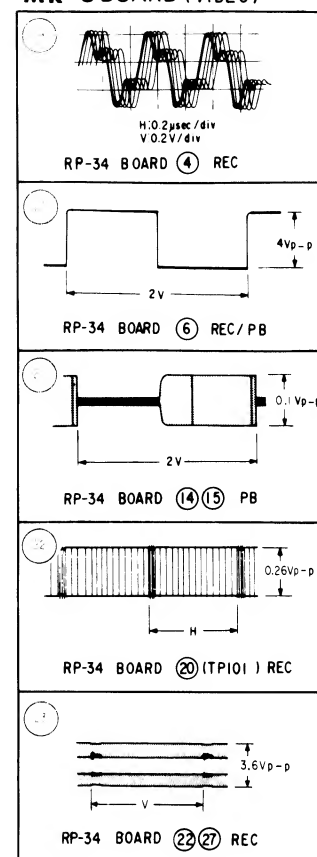
**MV-12**BOARD (VIDEO)



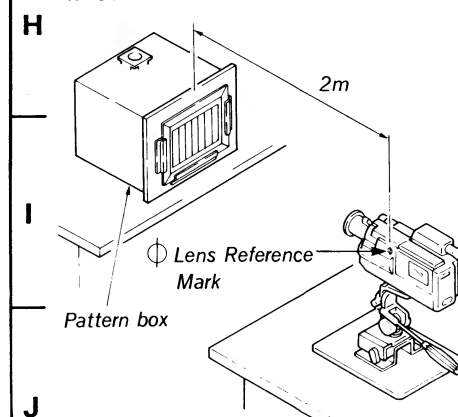
**Note:**

- **Caution when replacing chip parts.**  
New parts must be attached after removal of chip.  
Be careful not to heat the minus side of tantalum capacitor, because it is damaged by the head.
- All resistors are in ohms, 1/10W unless otherwise noted.
- All capacitors are in  $\mu\text{F}$  (p:pF) unless otherwise noted.  
50V or less are not indicated except for electrolytic capacitors.
- All variable and semi fixed resistors have characteristic curve B, unless otherwise noted.
-  : panel designation.
-  : Nonflammable resistor
-  : B+ bus.
-  : adjustment for repair.
- Voltage and waveform measuring conditions:
  - (1) Sample object: Pattern box colour bars.
  - (2) Voltage values: Relative to ground, measured with a DC digital multimeter (impedance 10M-ohm or more)

**MR-8 BOARD (VIDEO)**



## 1. Connection



2. Adjust the zooming of camera and the tripod so that the output waveform of Fig. a and the picture of Fig. b can be obtain.

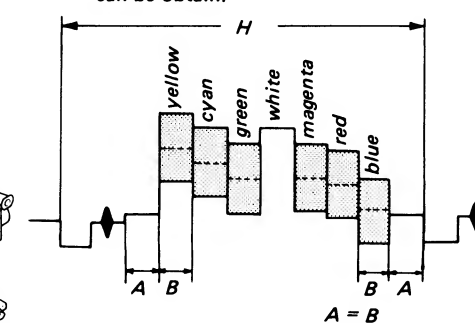


Fig.a Camera output waveform of No.⑦ terminal of FP-81 flexible board.

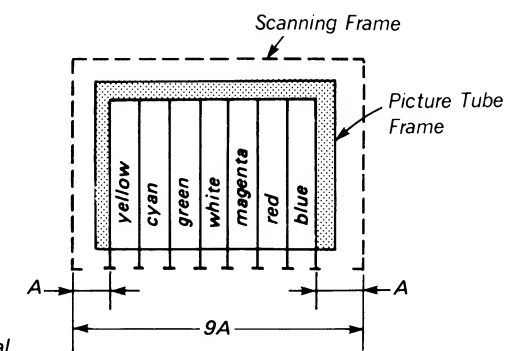


Fig. b Picture of TV monitor screen

SS-70(SERVO)PRINTED WIRING BOARD

—Ref. No. SS-70 BOARD: 6,000 Series—

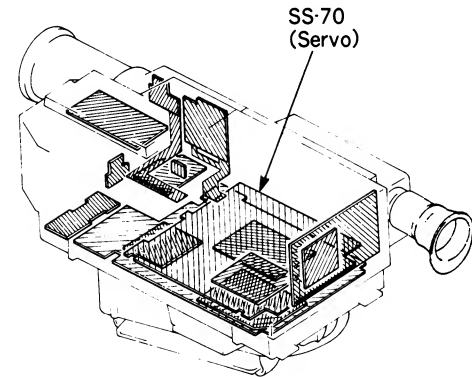
Note:

- — : indicates a lead wire mounted on the component side.
  - — : indicates a lead wire mounted on the printed side.
  - ⊗ : Through hole.
  - : Pattern from the side which enables seeing.
  - : B+ pattern from the side which enables seeing.
  - : Digital transistor (SS-70: Q307, Q309, Q310, Q311, Q317, Q318, Q321, Q322, Q324, Q325, Q328, Q501, Q504, Q506, Q507, Q513, Q514, Q515, Q522, Q528, Q529, Q529, Q531, Q532) transistor with resistor.
- Refer to the SS-70 board schematic diagram for digital transistor.

Caution:

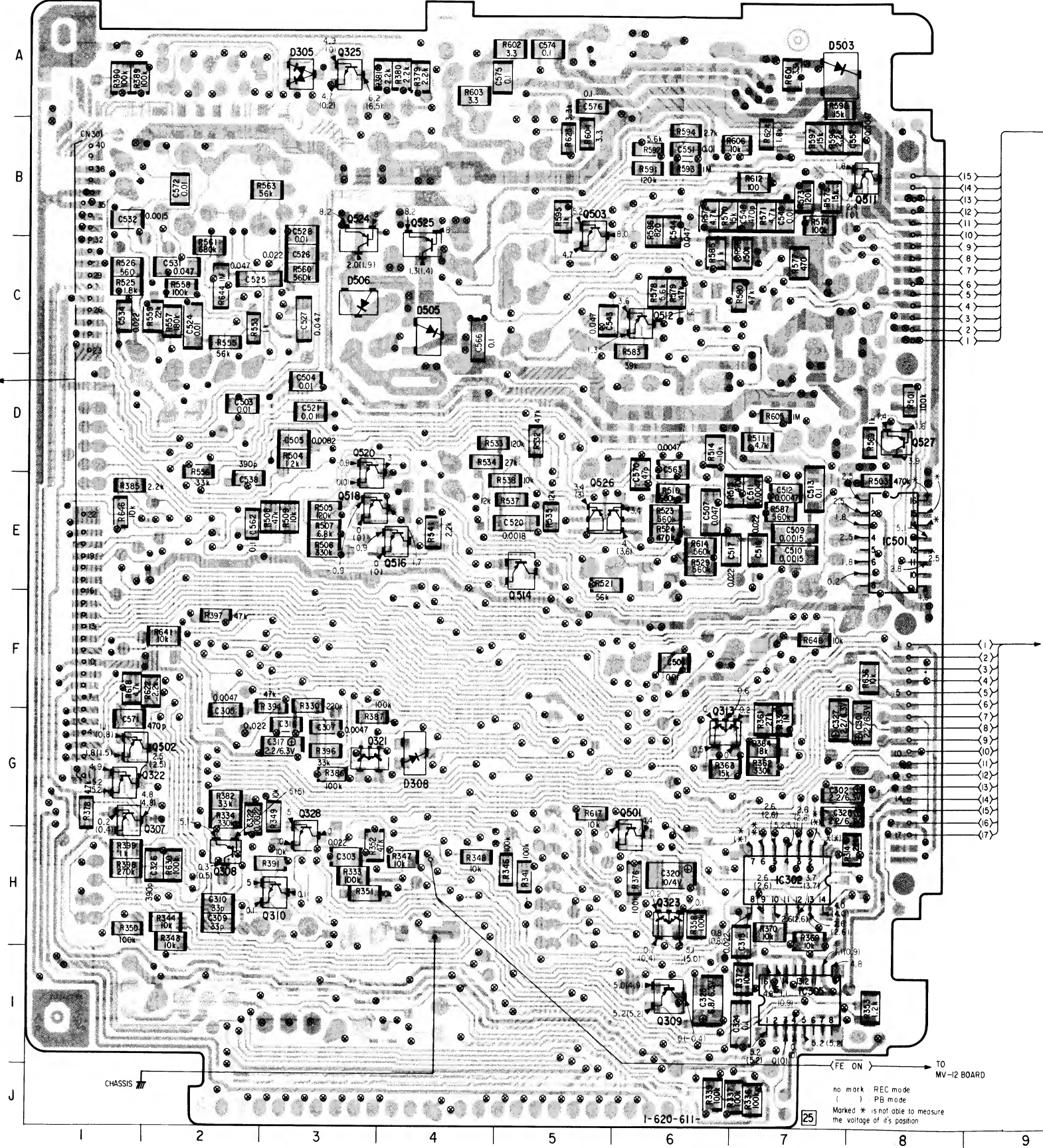
Pattern face side: Parts on the pattern face side seen from (Solder Side) the pattern face are indicated.  
Parts face side: Parts on the parts face side seen from (Component Side) the parts face are indicated.

When indicating parts by reference number, please include the board name.

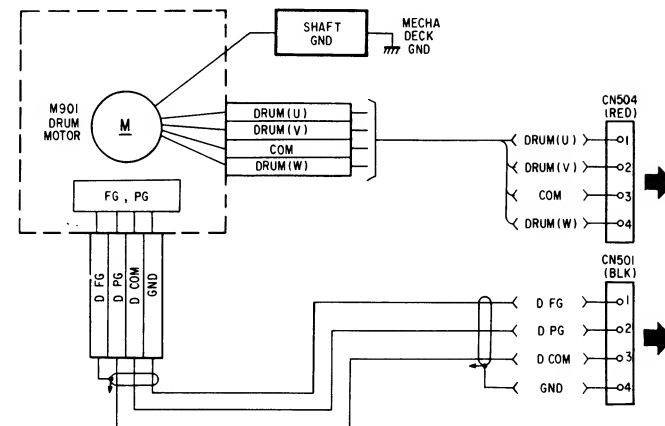
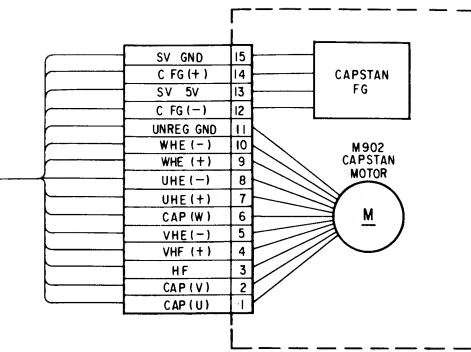
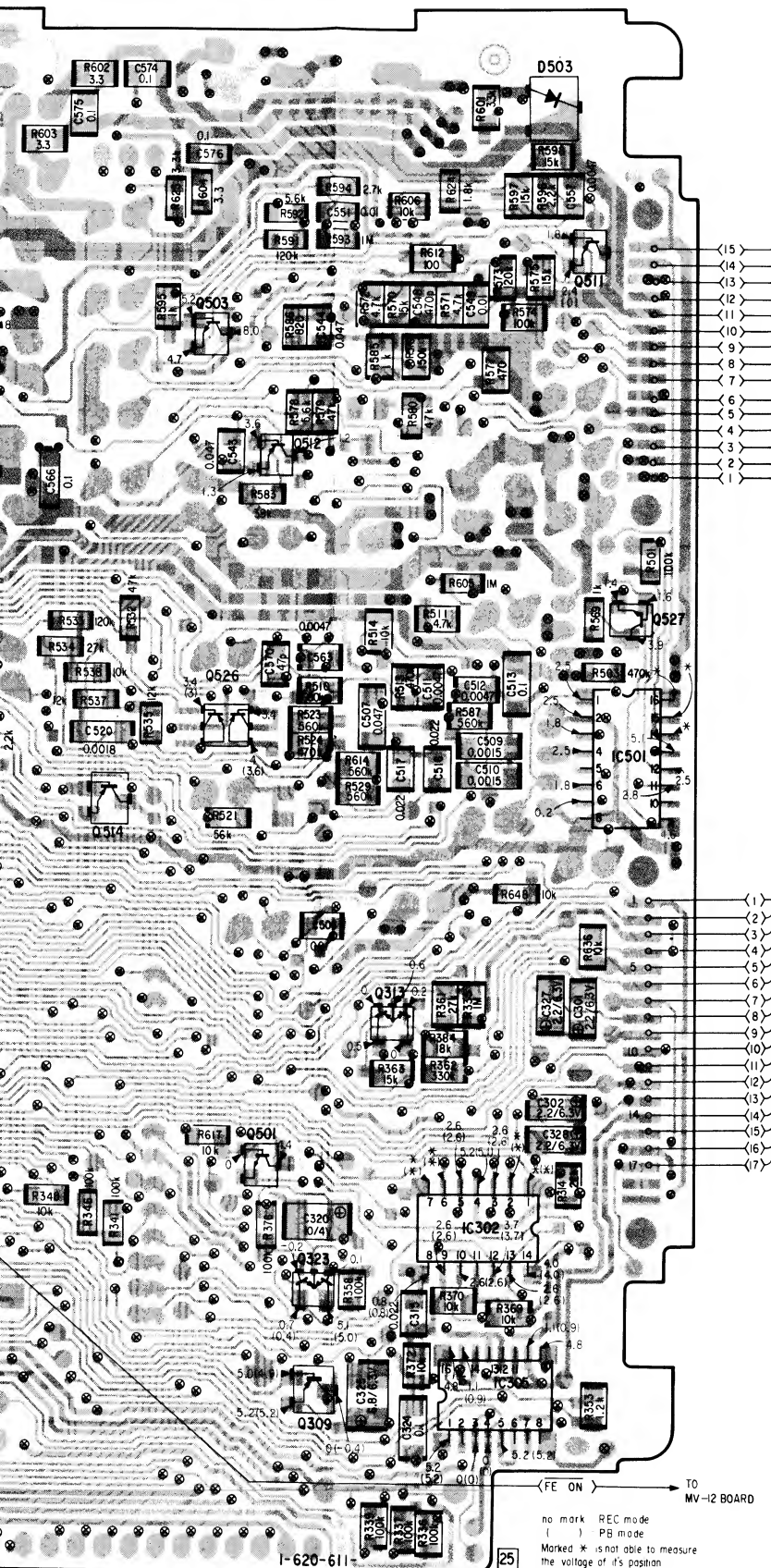


D305	A-3
D308	G-4
D503	A-7
D505	C-4
D506	C-3
IC302	H-7
IC305	I-7
IC501	E-8
Q307	G-1
Q308	H-2
Q309	I-6
Q310	H-3
Q313	G-6
Q321	G-3
Q322	G-1
Q323	H-6
Q325	A-3
Q328	H-3
Q501	G-6
Q502	G-1
Q503	C-5
Q511	B-8
Q512	C-6
Q514	E-5
Q516	E-4
Q518	E-4
Q520	E-4
Q524	C-3
Q525	C-4
Q526	E-6
Q527	D-8

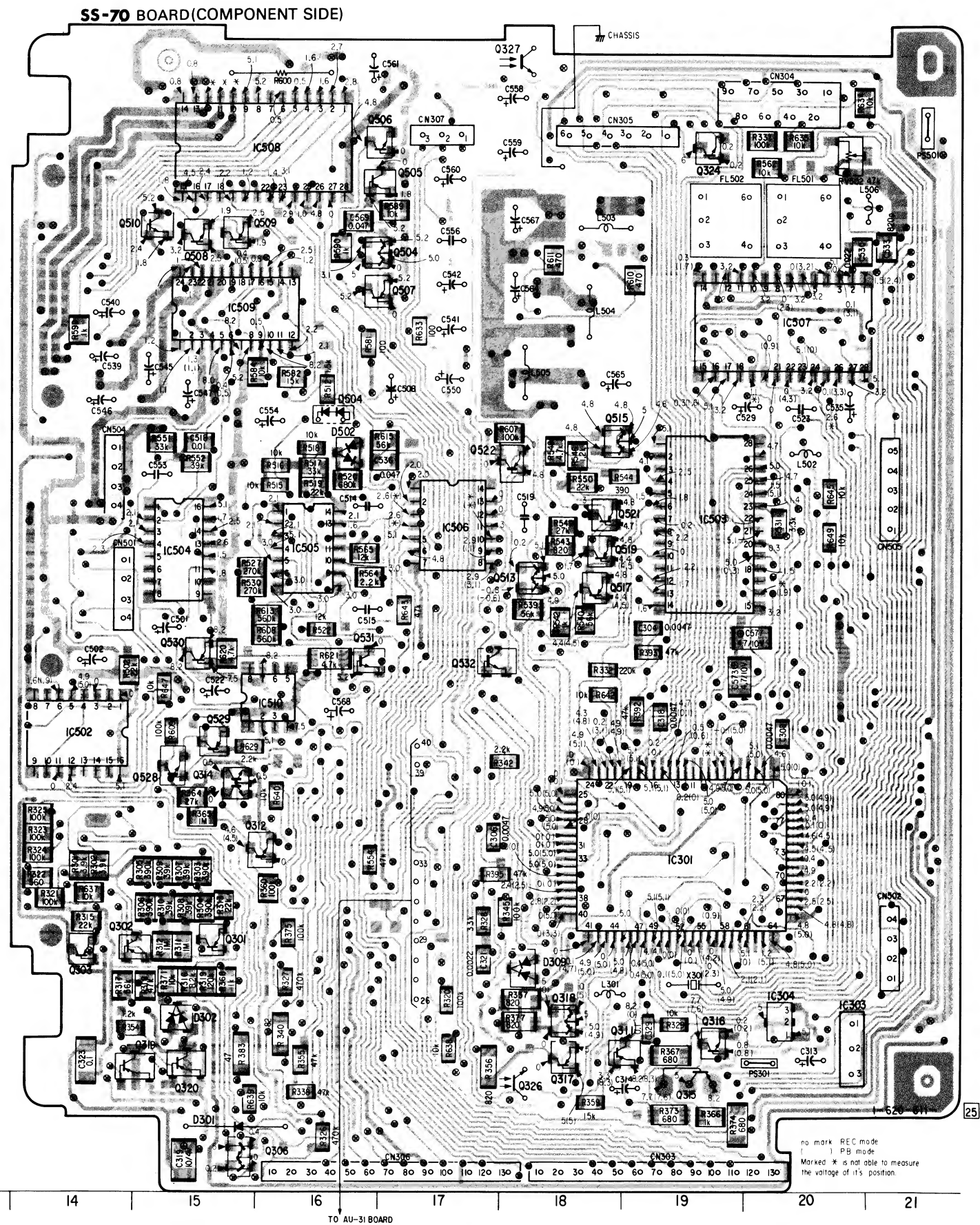
SS-70 BOARD (SOLDER SIDE)







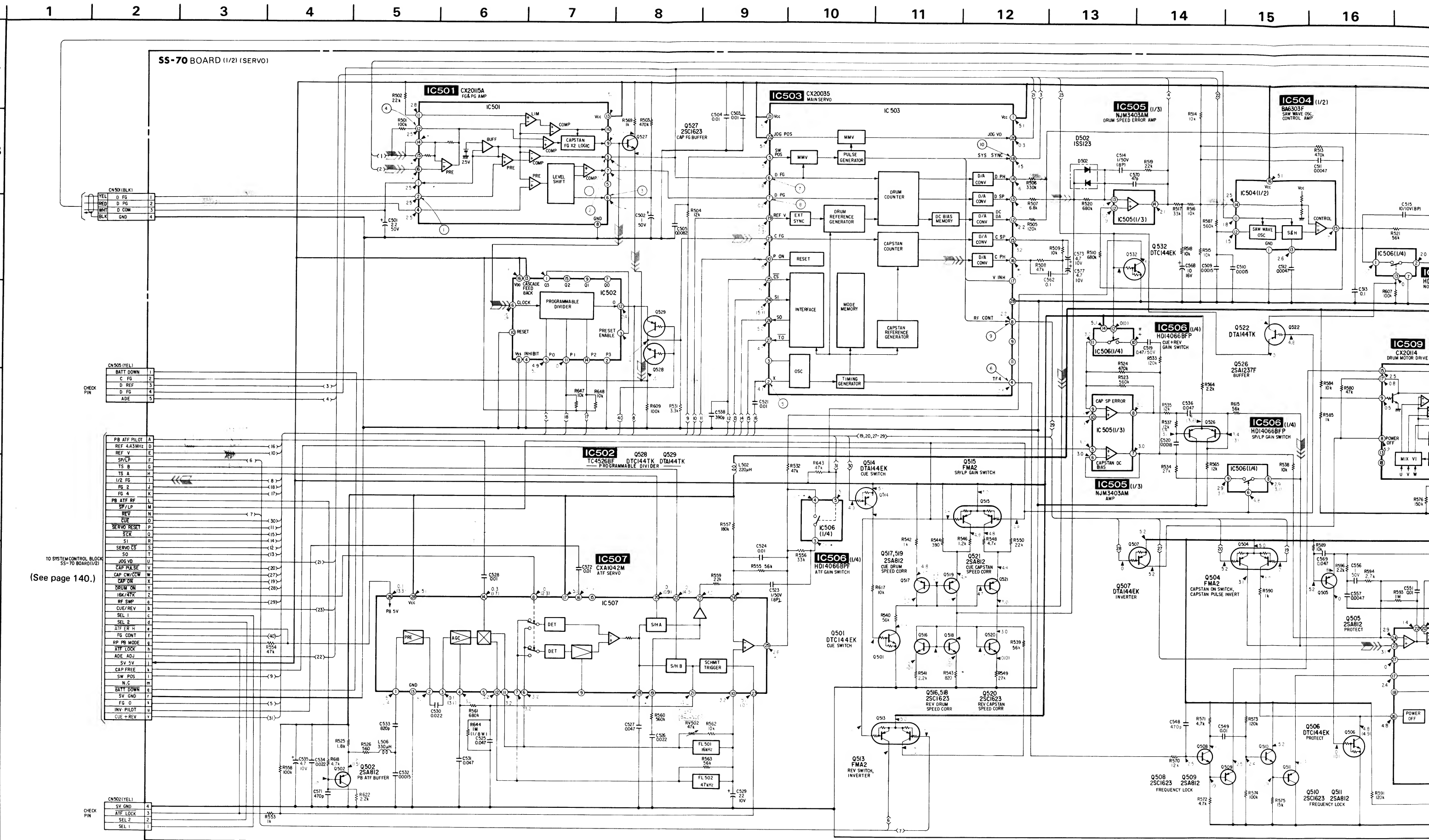
D301	J-15	Q317	F-18
D302	I-15	Q318	F-18
D309	H-18	Q319	F-15
D502	D-16	Q320	F-15
D504	D-16	Q324	B-19
		Q326	F-18
IC301	G-19	Q327	A-18
IC303	I-20	Q504	B-17
IC304	I-20	Q505	B-17
IC502	F-14	Q506	A-17
IC503	E-19	Q507	C-17
IC504	E-15	Q508	B-15
IC505	E-16	Q509	B-15
IC506	E-17	Q510	B-15
IC507	C-20	Q513	E-18
IC508	B-15	Q515	D-18
IC509	C-15	Q517	E-18
IC510	F-16	Q519	E-18
		Q521	D-18
Q301	H-15	Q522	D-18
Q302	H-14	Q528	F-15
Q303	H-14	Q529	F-15
Q306	J-15	Q530	F-15
Q311	I-19	Q531	F-16
Q312	G-16	Q532	F-17
Q314	G-15		
Q315	I-19	RV502	B-20
Q316	I-19		

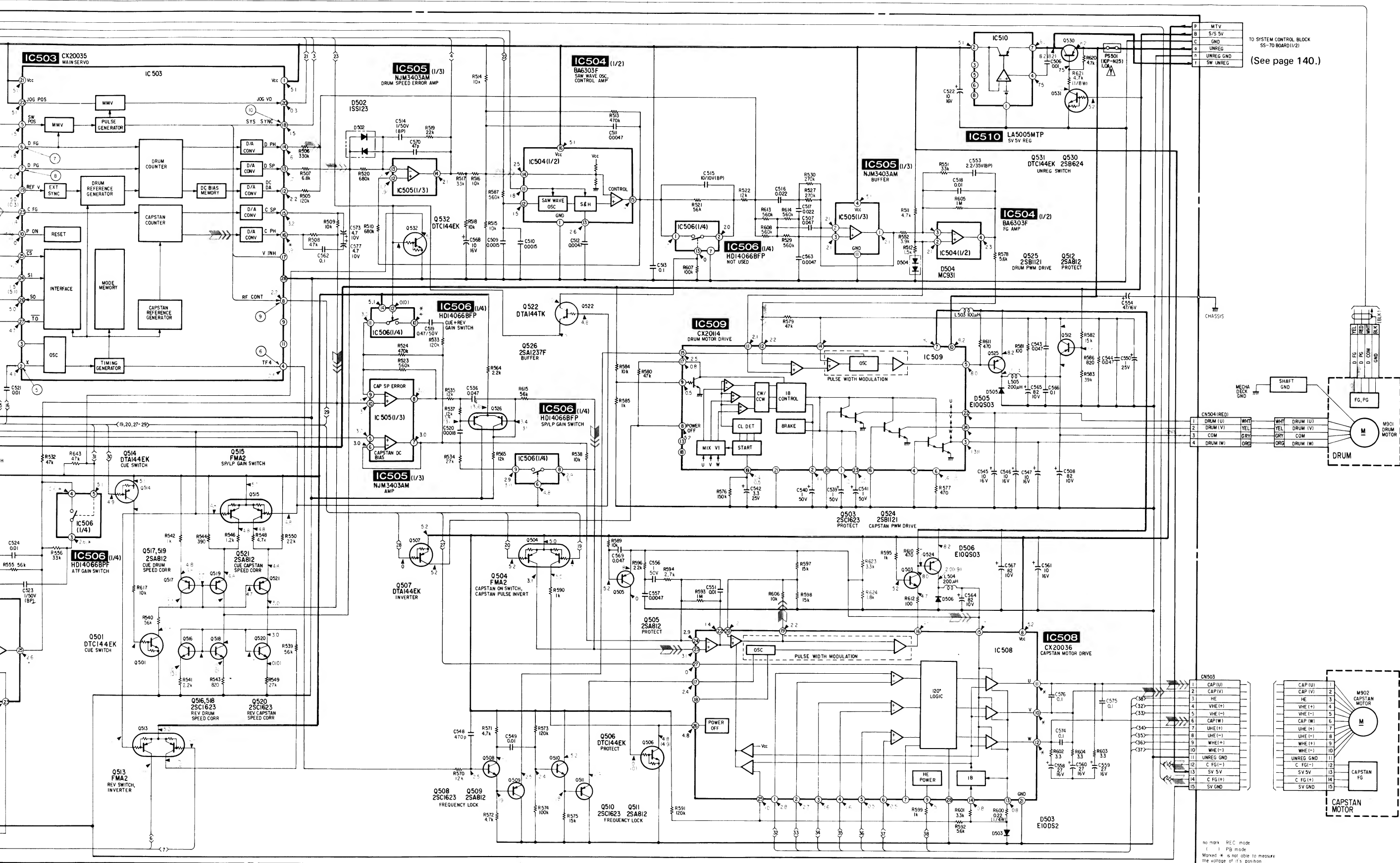


# SERVO SERVO





## SS-70(SERVO) SCHEMATIC DIAGRAM

—Ref. No. SS-70 BOARD: 6,000 Series—





**Note:**

- Caution when using new parts. New parts must be carefully noted by the manufacturer, because
- All resistors are
- All capacitors are 50V or less are
- All variable are unless otherwise
-  : panel
-  : Nonflaming
-  : B+ bus
-  : adjustable
- Voltage and wattage
  - (1) Sample or
  - (2) Voltage or

## 1. Connection



2. Adjust the  $z$  until the output  $w$  can be obtained.

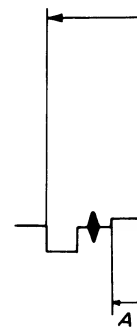
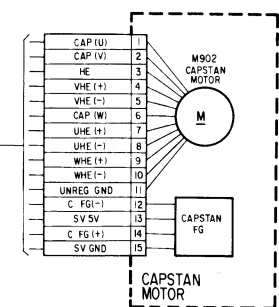
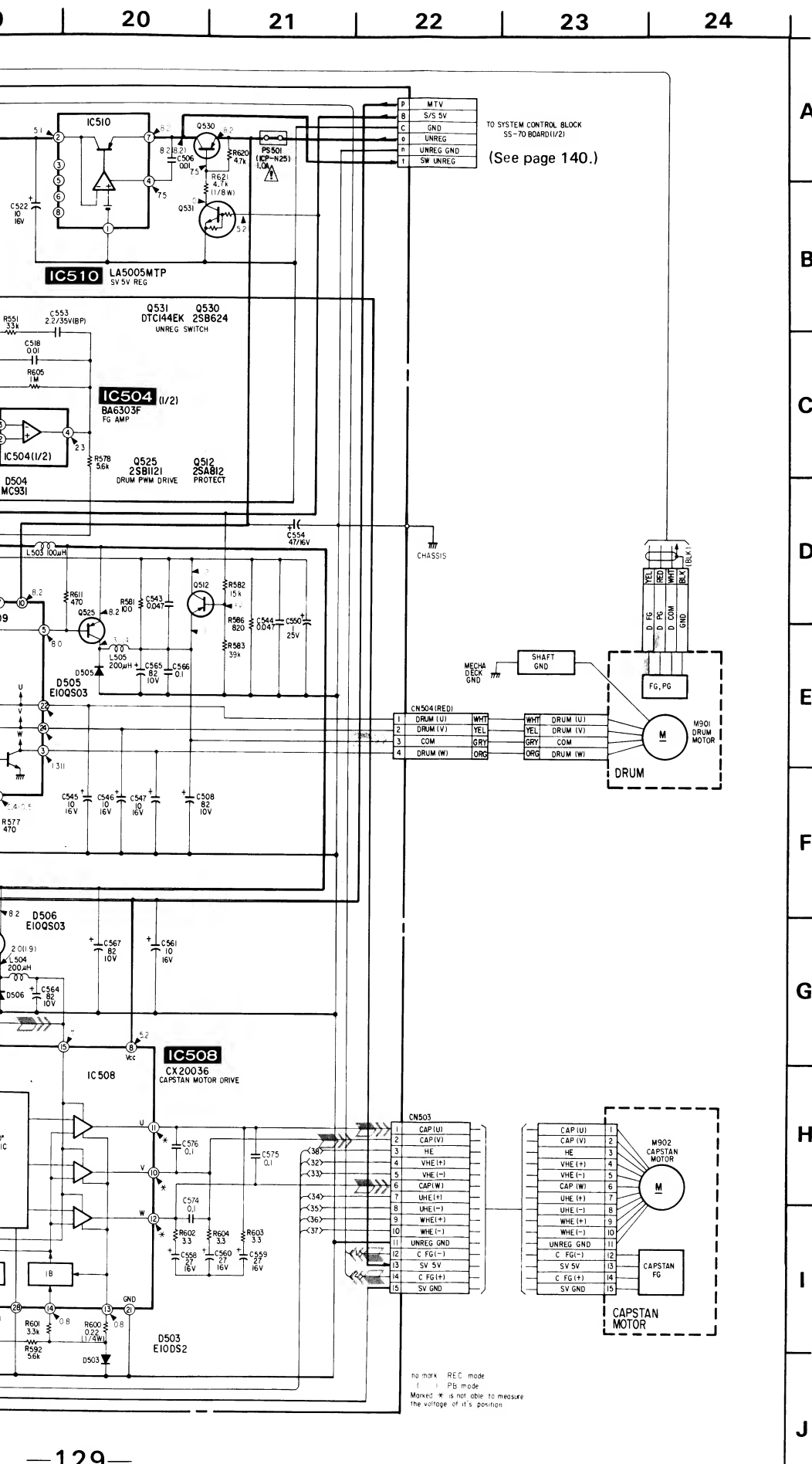


Fig.a Camera  
FP-81 fle

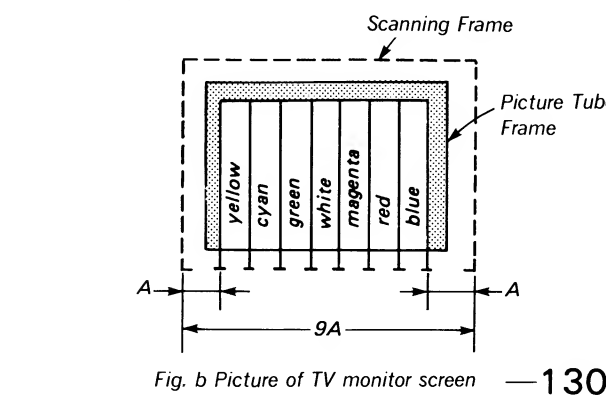
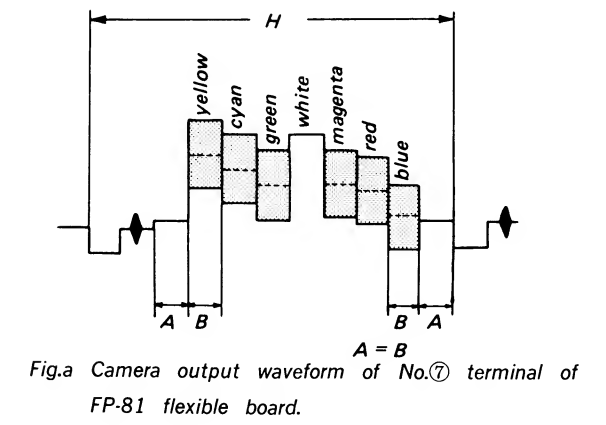






- Note:
- Caution when replacing chip parts. New parts must be attached after removal of chip. Be careful not to heat the minus side of tantalum capacitor, because it is damaged by the head.
  - All resistors are in ohms, 1/10W unless otherwise noted.
  - All capacitors are in  $\mu F$  (p:pF) unless otherwise noted. 50V or less are not indicated except for electrolytic capacitors.
  - All variable and semi fixed resistors have characteristic curve B, unless otherwise noted.
  - Panel designation.
  - Nonflammable resistor.
  - B+ bus.
  - adjustment for repair.
  - Voltage and waveform measuring conditions:  
(1) Sample object: Pattern box colour bars.  
(2) Voltage values: Relative to ground, measured with a DC digital multimeter (impedance 10M-ohm or more).

1. Connection
- 
2. Adjust the zooming of camera and the tripod so that the output waveform of Fig. a and the picture of Fig. b can be obtain.

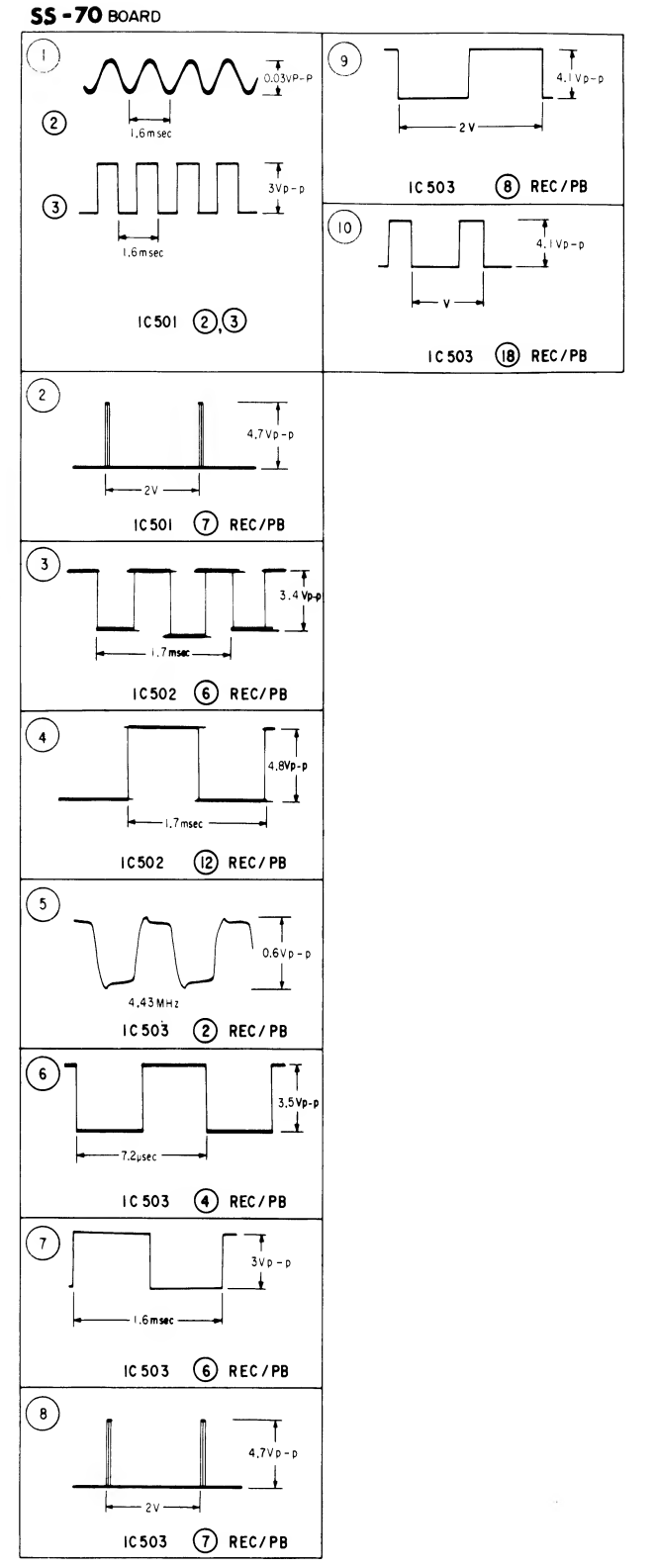


Signal path

	REC	REC/PB	PB
Drum speed servo			
Drum phase servo			
Drum servo (speed and phase)			
Capstan speed servo			
Capstan phase servo			
Capstan servo (speed and phase)			

Note: The components identified by shading and mark are critical for safety. Replace only with part number specified.

When indicating parts by reference number, please include the board name.



**Note:**

- : indicates a lead wire mounted on the component side.
- : indicates a lead wire mounted on the printed side.
- ⊗ : Through hole.
- : Pattern from the side which enables seeing.
- : Pattern from the side which enables seeing.
- : B+ pattern from the side which enables seeing.
- Digital transistor (SS-70: Q307, Q309, Q310, Q311, Q317, Q318, Q321, Q322, Q324, Q325, Q328, Q501, Q504, Q506, Q507, Q513, Q514, Q515, Q522, Q528, Q529, Q531, Q532) transistor with resistor.

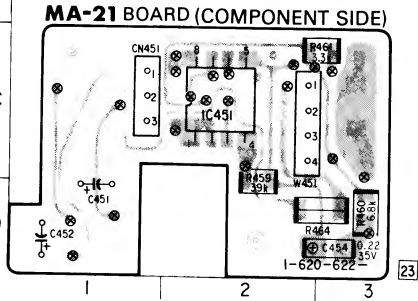
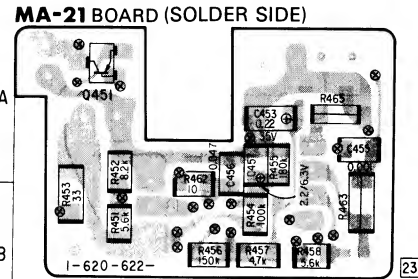
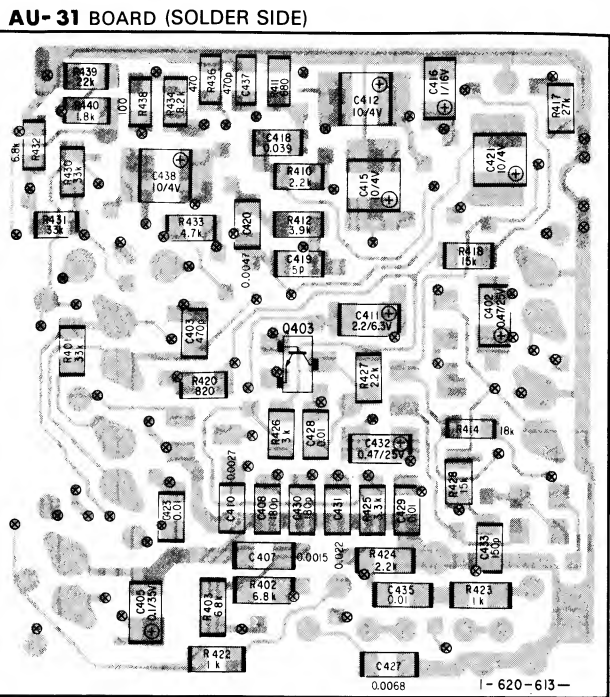
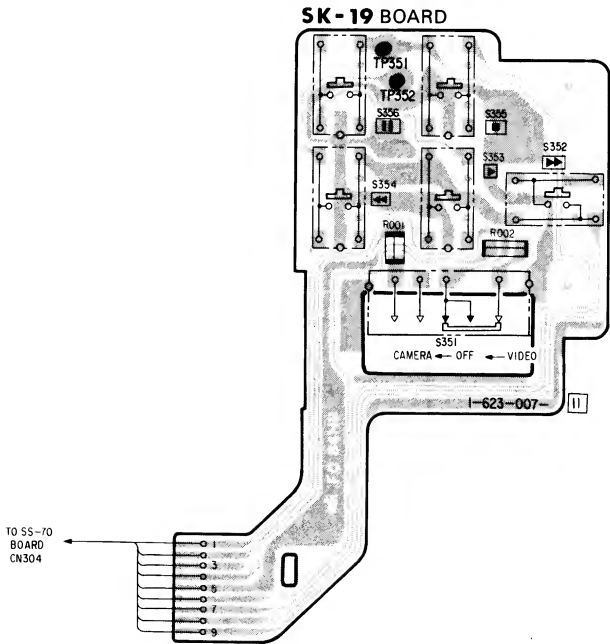
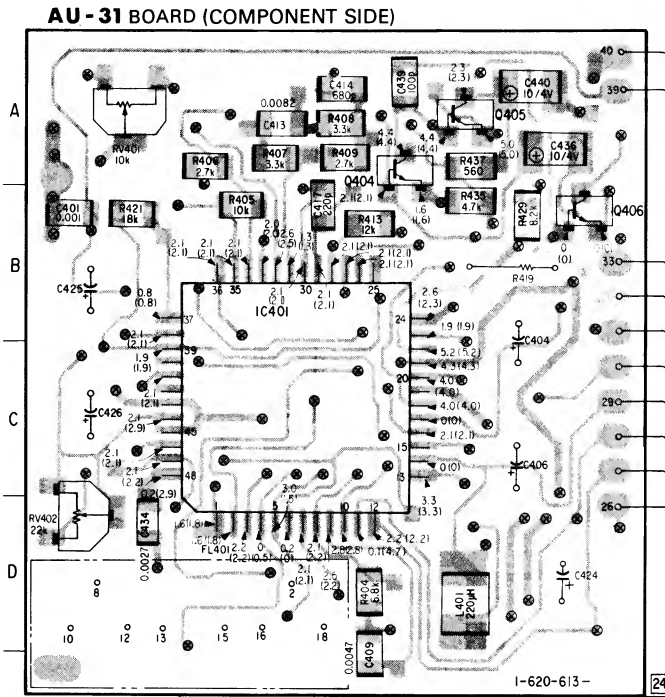
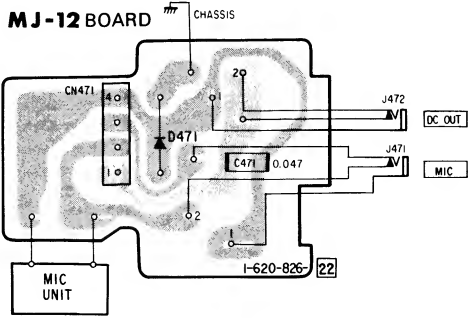
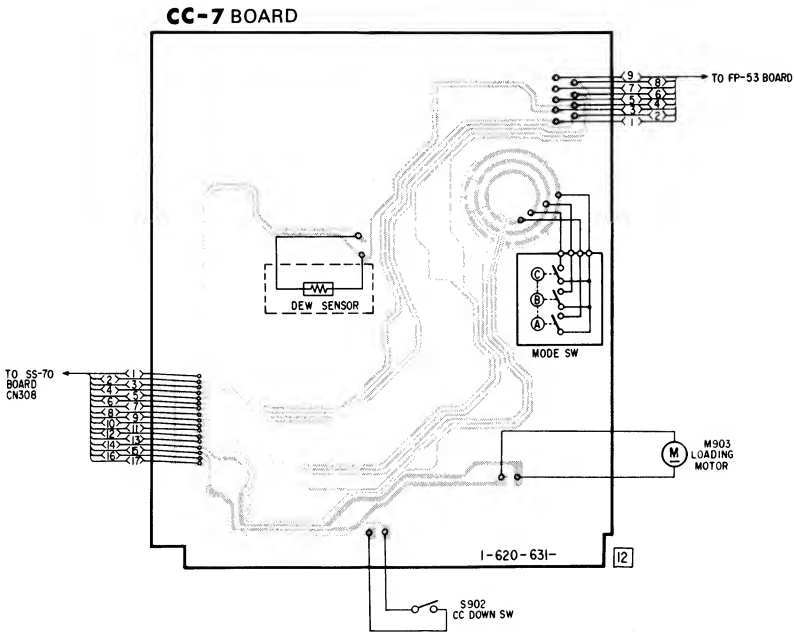
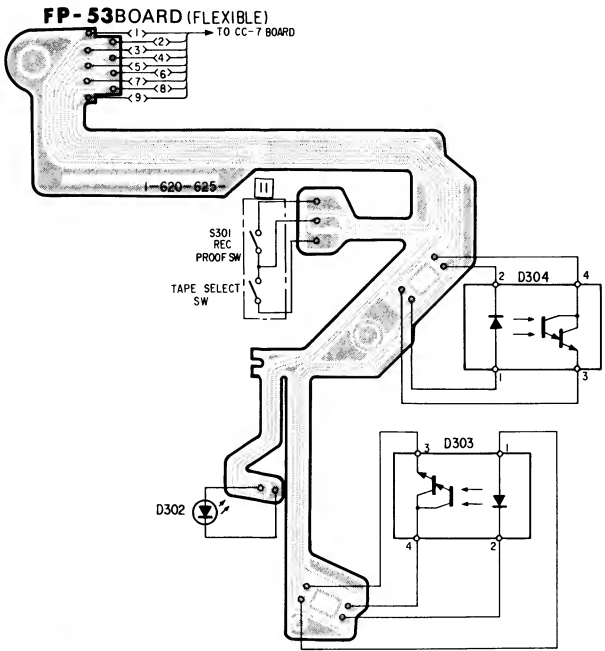
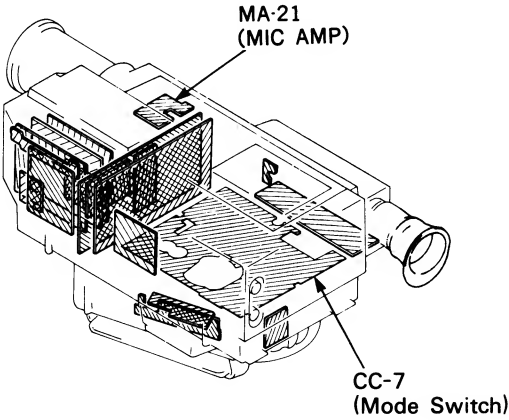
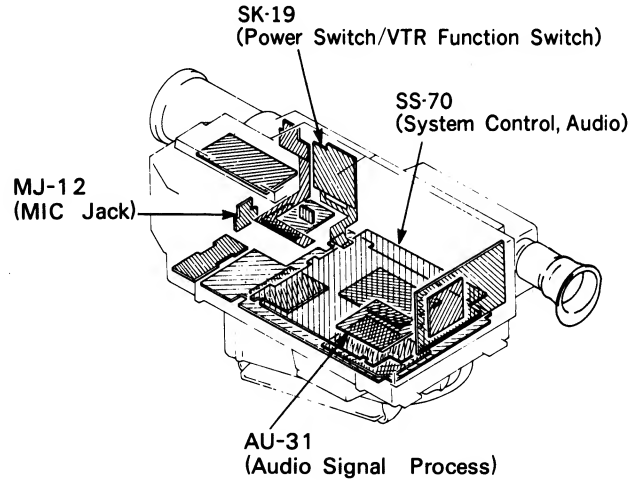
Refer to the SS-70 board schematic diagram for digital transistor.

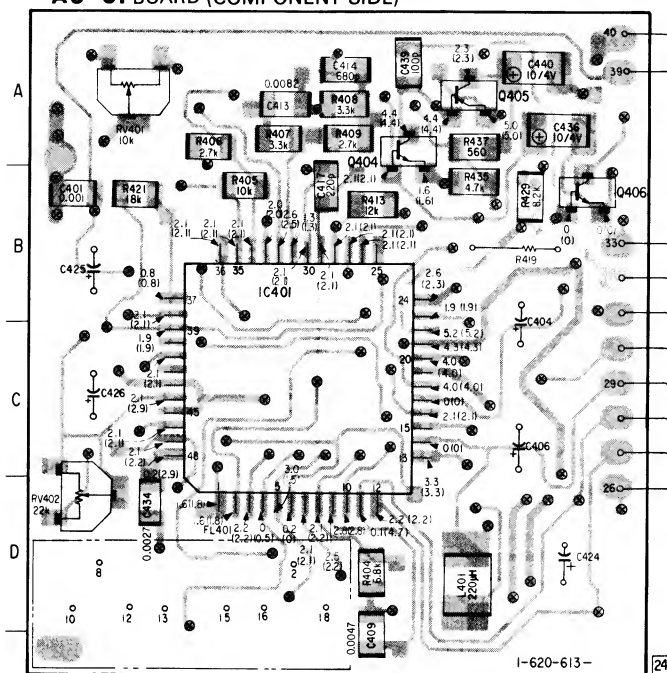
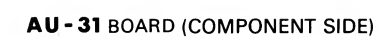
**Caution:**

Pattern face side: Parts on the pattern face side seen from (Solder Side) the pattern face are indicated.

Parts face side: Parts on the parts face side seen from (Component Side) the parts face are indicated.

When indicating parts by reference number, please include the board name.



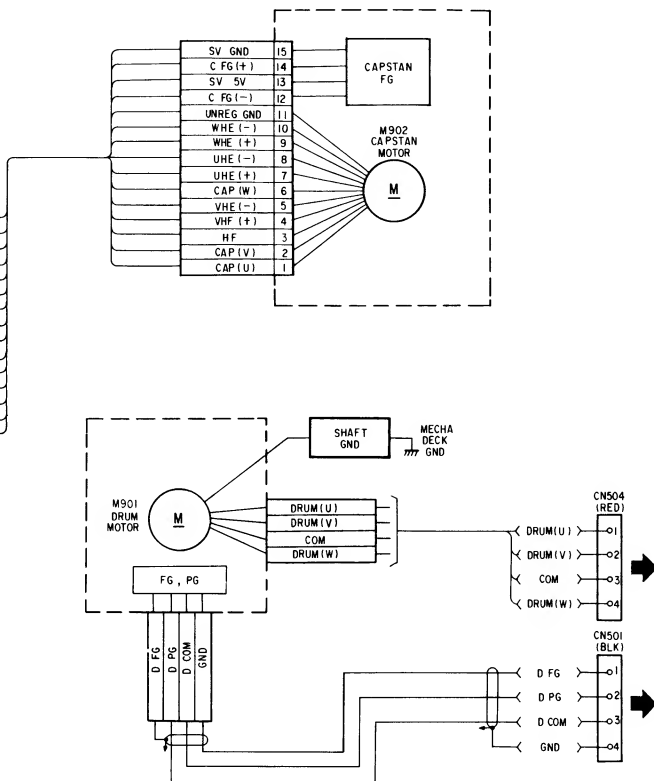


IC401	C-2
Q404	A-3
Q405	A-3
Q406	B-4
RV401	A-1
RV402	D-1

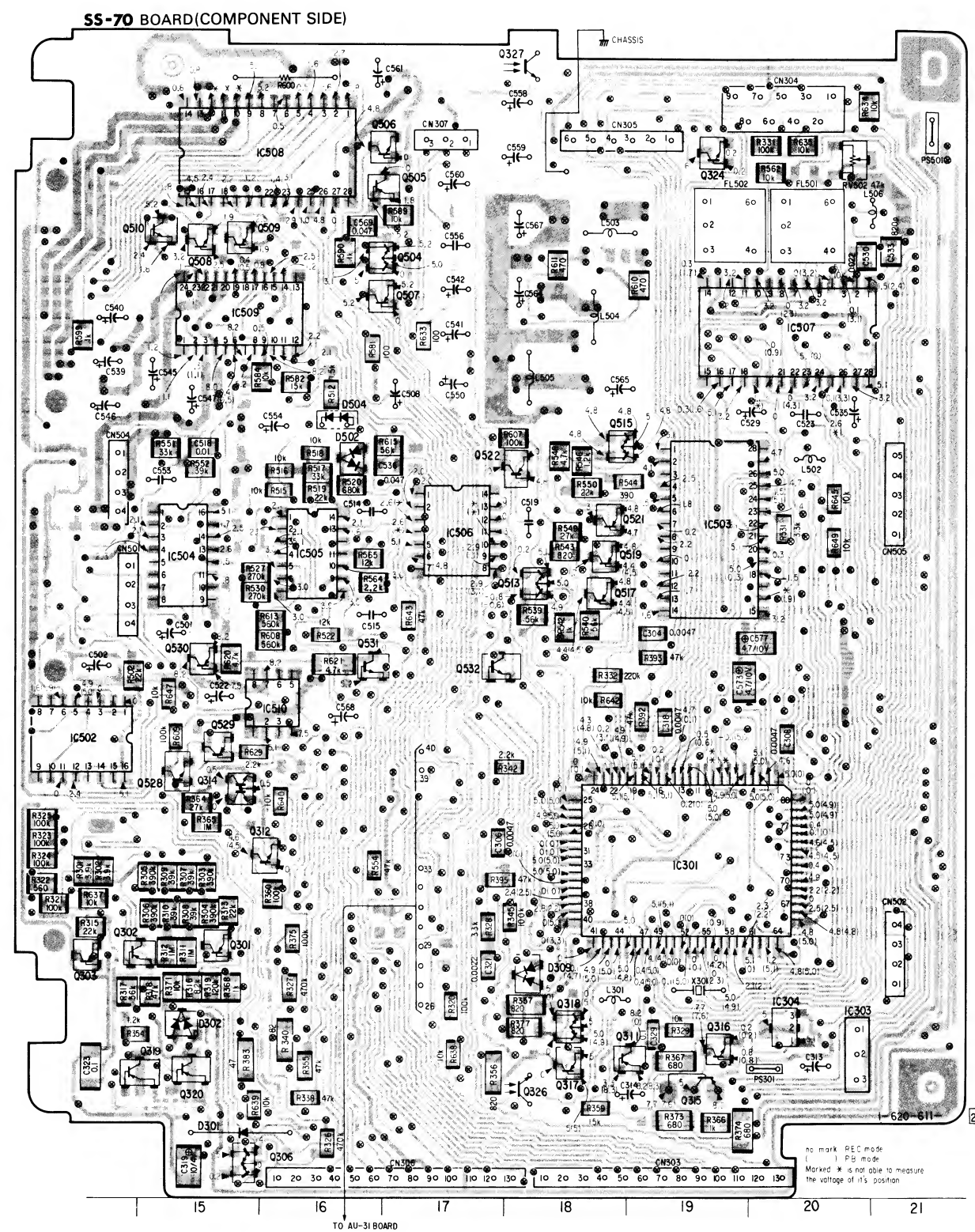
Q404 C-7

D305	A-3
D308	G-4
D503	A-7
D505	C-3
D506	C-4
IC302	H-7
IC305	I-7
IC501	E-8
Q307	G-1
Q308	H-2
Q309	I-6
Q310	H-3
Q313	G-6
Q321	G-3
Q322	G-1
Q323	H-6
Q325	A-3
Q328	H-3
Q501	G-6
Q502	G-1
Q503	C-5
Q511	B-8
Q512	C-6
Q514	E-5
Q516	E-4
Q518	E-4
Q520	E-4
Q524	C-3
Q525	C-4
Q526	E-6
Q527	D-8





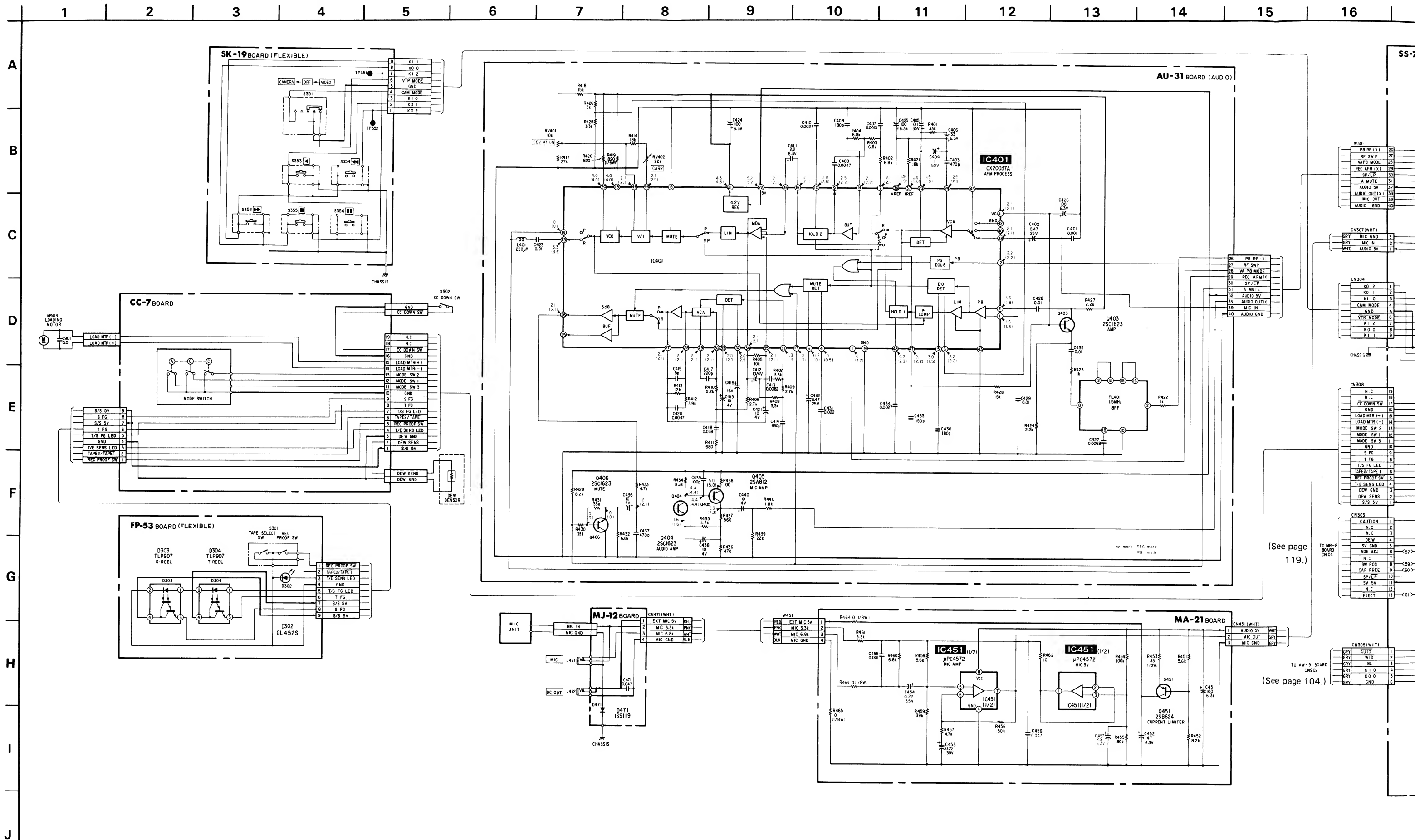
D301	J-15	Q317	I-18
D302	I-15	Q318	I-18
D309	H-18	Q319	I-15
D502	D-16	Q320	I-15
D504	D-16	Q324	B-19
		Q326	I-18
IC301	G-19	Q327	A-18
IC303	I-20	Q504	B-17
IC304	I-20	Q505	B-17
IC502	F-14	Q506	A-17
IC503	E-19	Q507	C-17
IC504	E-15	Q508	B-15
IC505	E-16	Q509	B-15
IC506	E-17	Q510	B-15
IC507	C-20	Q513	E-18
IC508	B-15	Q515	D-18
IC509	C-15	Q517	E-18
IC510	F-16	Q519	E-18
		Q521	D-18
		Q522	D-18
Q301	H-15	Q528	F-15
Q302	H-14	Q529	F-15
Q303	H-14	Q530	F-15
Q306	J-15	Q531	F-16
Q311	I-19	Q532	F-17
Q312	G-16		
Q314	G-15		
Q315	I-19	RV502	B-20
Q316	I-19		

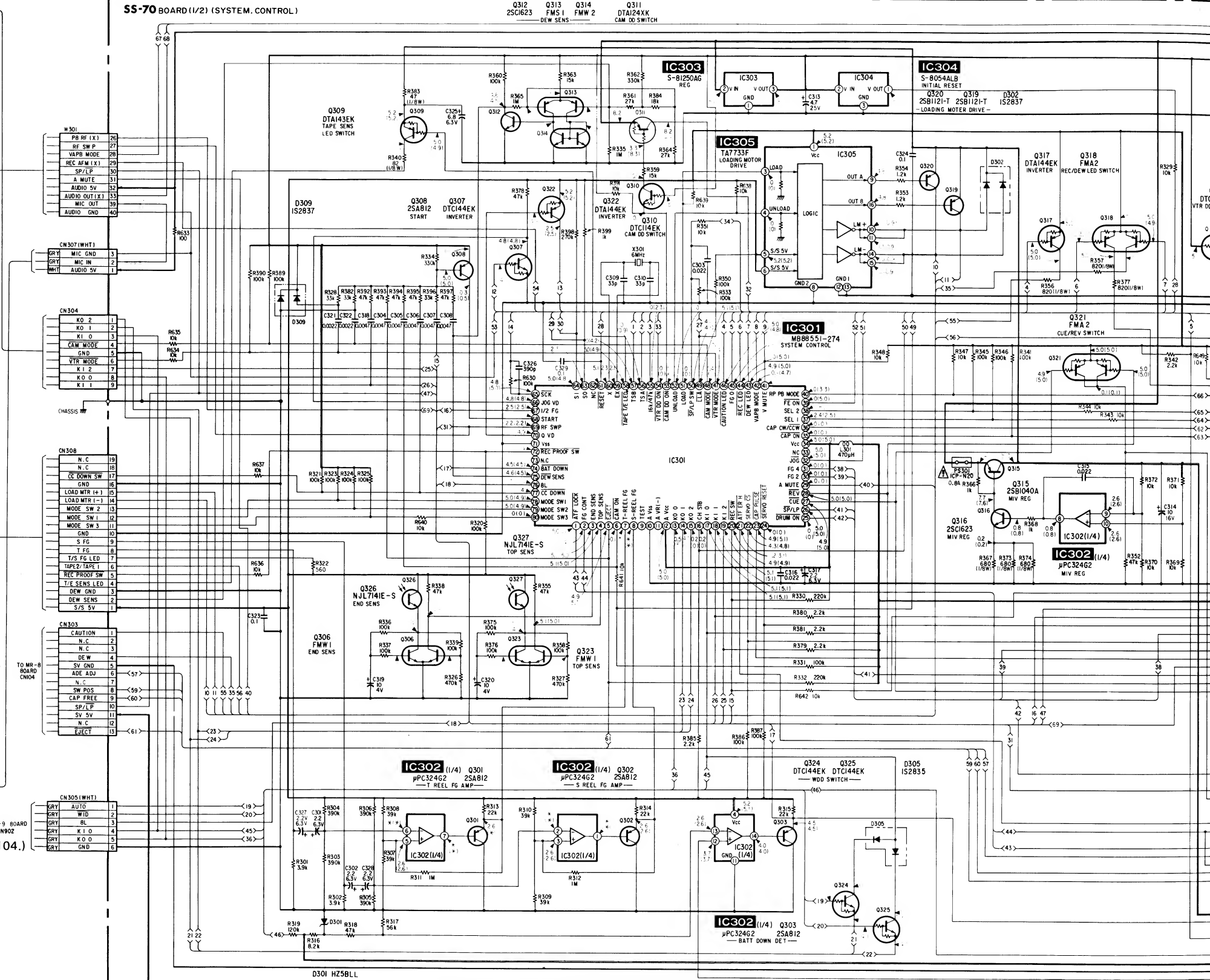
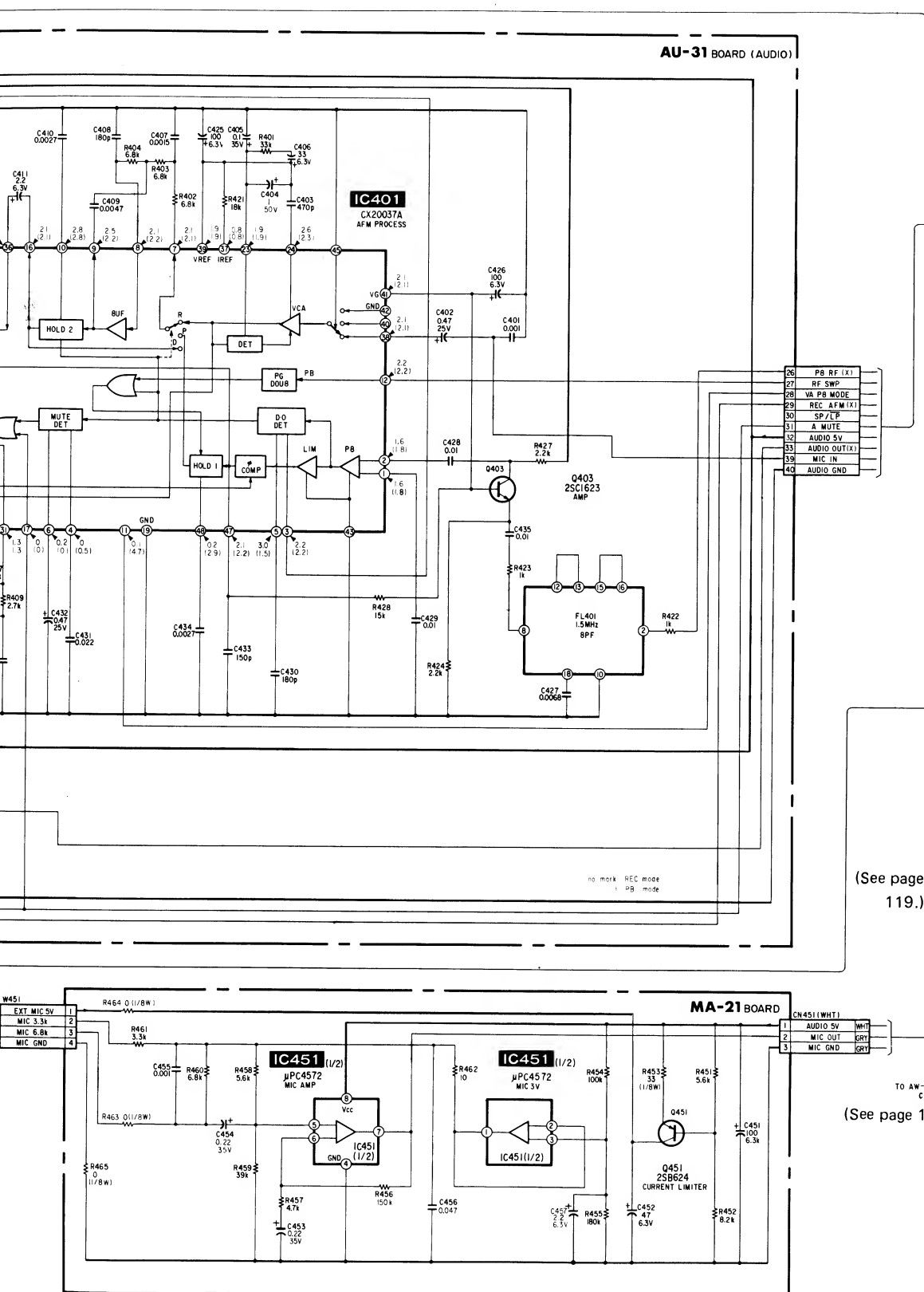


## SYSTEM CONTROL,AUDIO SYSTEM CONTROL,AUDIO


SS-70(SYSTEM CONTROL, AUDIO), AU-31(AUDIO SIGNAL PROCESS), SK-19(POWER SWITCH/VTR FUNCTION SWITCH), MA-21(MIC AMP), MJ-12(MIC JACK), CC-7(MODE SWITCH), FP-53(TAPE SELECT/REC PROOF) SCHEMATIC DIAGRAM

—Ref. No. SS-70, SK-19, AU-31, MA-21, MJ-12 and FP-53 BOARDS : 6, 000 series—



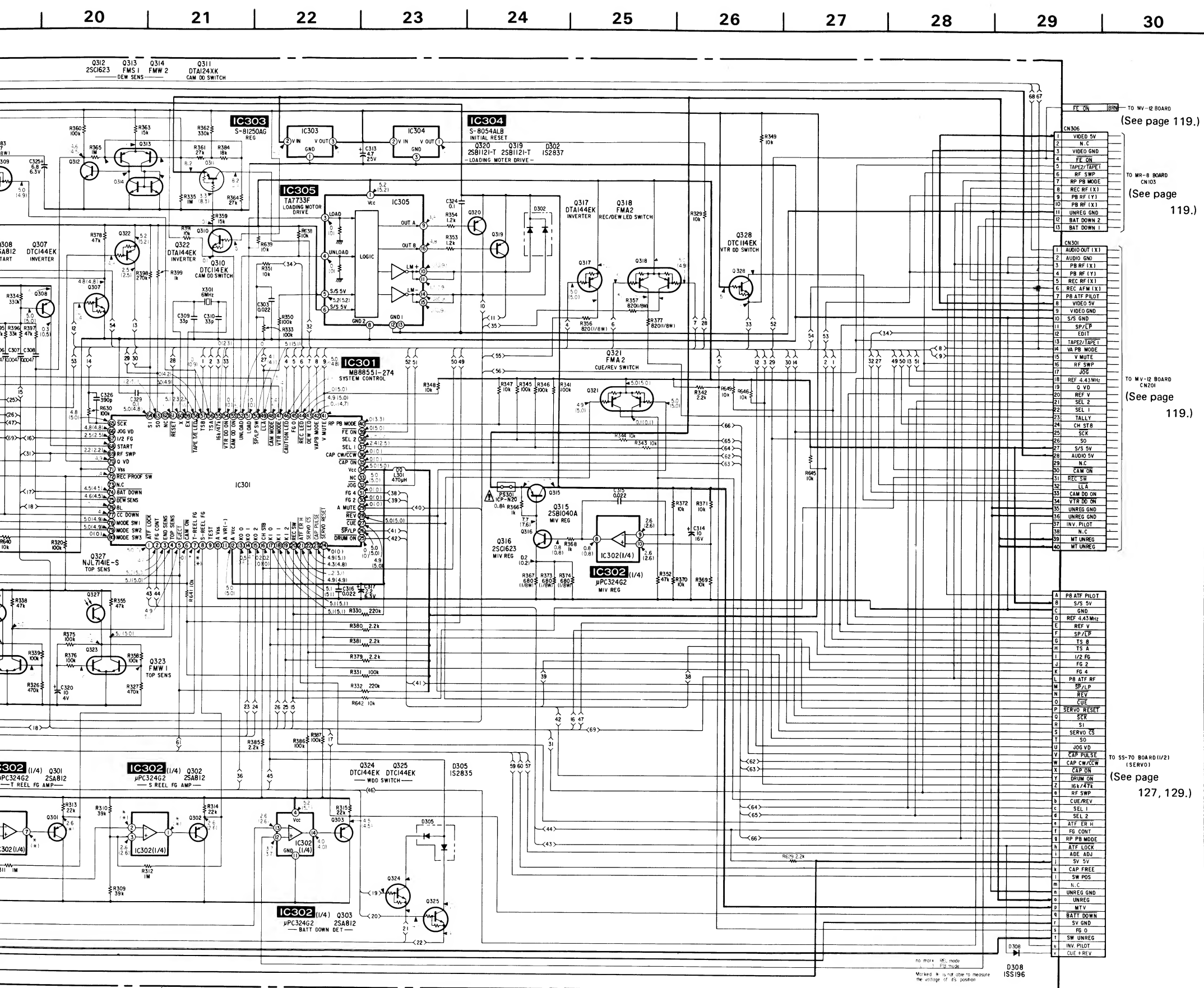


• Signal path

Note: The components identified by shading and mark  are critical for safety. Replace only with part number specified.

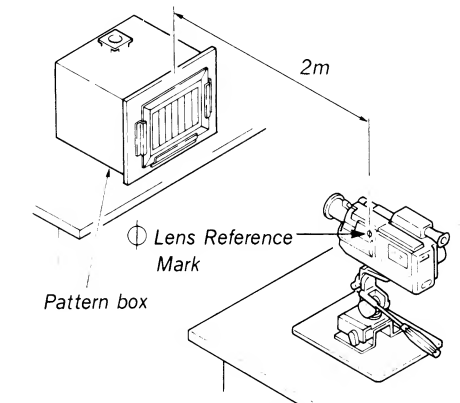
When indicating parts by reference number, please include the board name.





- Note:**
- Caution when replacing chip parts. New parts must be attached after removal of chip. Be careful not to heat the minus side of tantalum capacitor, because it is damaged by the head.
  - All resistors are in ohms, 1/10W unless otherwise noted.
  - All capacitors are in  $\mu F$  (p:pF) unless otherwise noted. 50V or less are not indicated except for electrolytic capacitors.
  - All variable and semi fixed resistors have characteristic curve B, unless otherwise noted.
  - Panel designation.
  - Nonflammable resistor.
  - B+ bus.
  - Adjustment for repair.
  - Voltage and waveform measuring conditions.
    - Sample object: Pattern box colour bars.
    - Voltage values: Relative to ground, measured with a DC digital multimeter (impedance 10M-ohm or more).

## 1. Connection



2. Adjust the zooming of camera and the tripod so that the output waveform of Fig. a and the picture of Fig. b can be obtain.

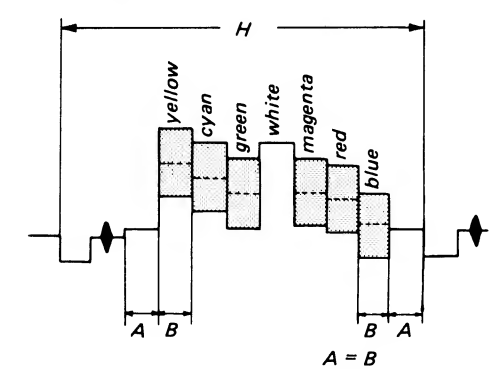


Fig.a Camera output waveform of No.7 terminal of FP-81 flexible board.

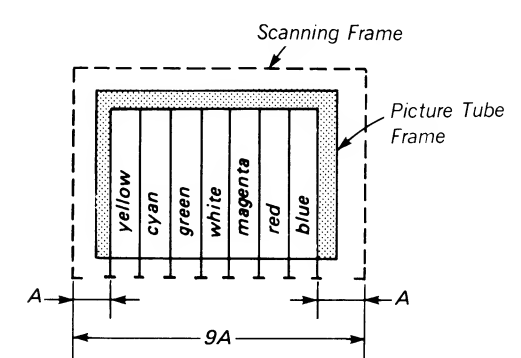


Fig. b Picture of TV monitor screen

**Note:** The components identified by shading and mark  $\Delta$  are critical for safety. Replace only with part number specified.

When indicating parts by reference number, please include the board name.

VF-10(VIEWFINDER), LD-7(LED) PRINTED WIRING BOARDS

—Ref. No. VF-10 and LD-7 BOARDS : 7,000 series—

Note:

- — : indicates a lead wire mounted on the component side.
- — : indicates a lead wire mounted on the printed side.
- ⊗ : Through hole.
- : Pattern from the side which enables seeing.
- : B+ pattern from the side which enables seeing.

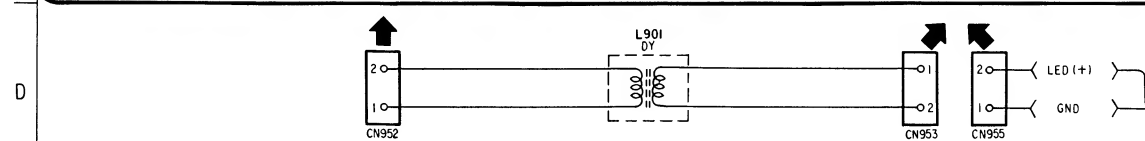
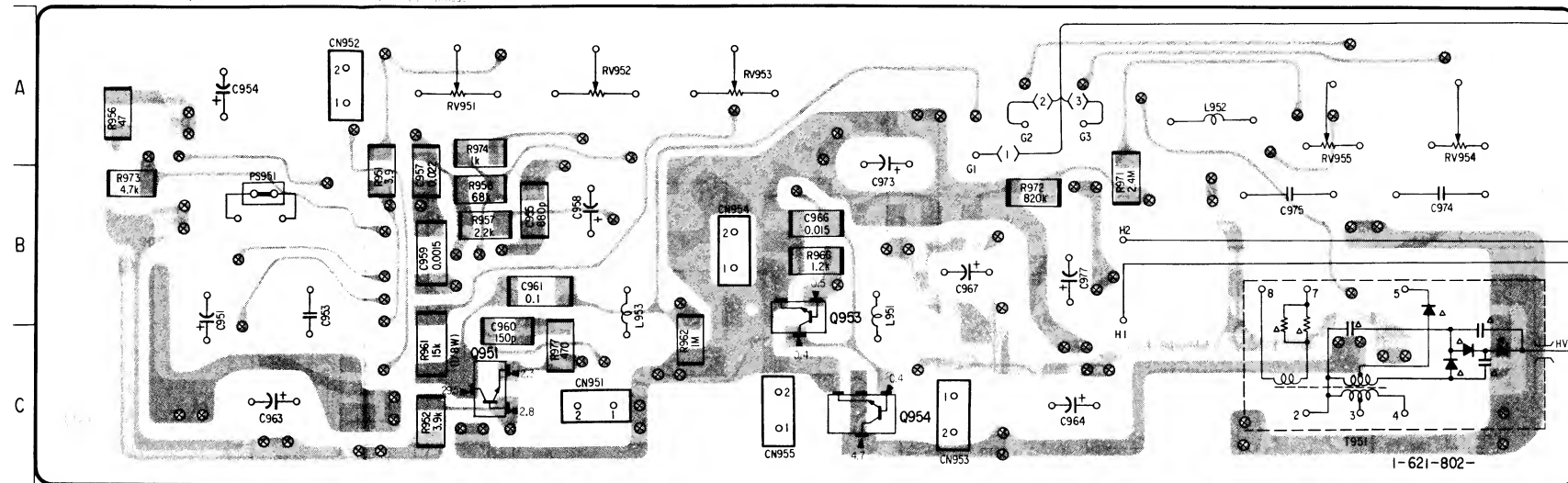
Caution:

Pattern face side: Parts on the pattern face side seen from (Solder Side) the pattern face are indicated.  
Parts face side: Parts on the parts face side seen from (Component Side) the parts face are indicated.

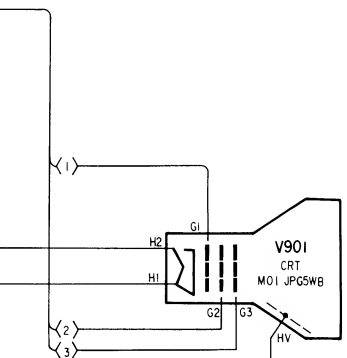
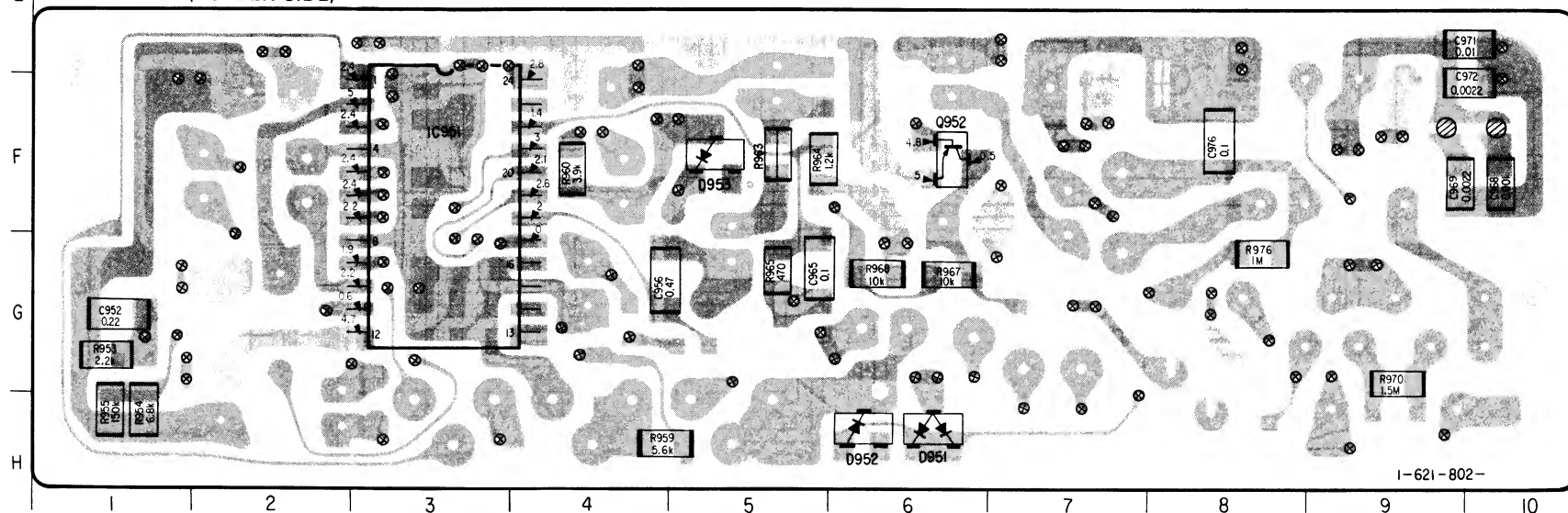
When indicating parts by reference number, please include the board name.

D951	H-6
D952	H-6
D953	F-5
IC951	F-3
Q951	C-3
Q952	F-6
Q953	B-5
Q954	C-6
RV951	A-3
RV952	A-4
RV953	A-5
RV954	A-9
RV955	A-9

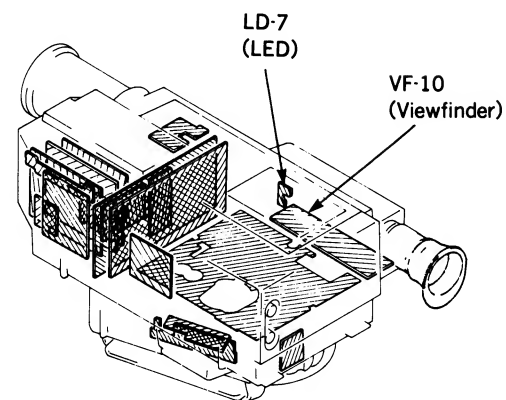
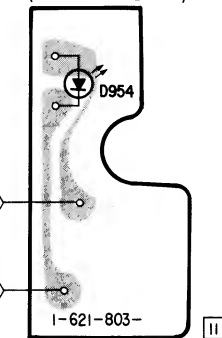
VF-10 BOARD (COMPONENT SIDE)



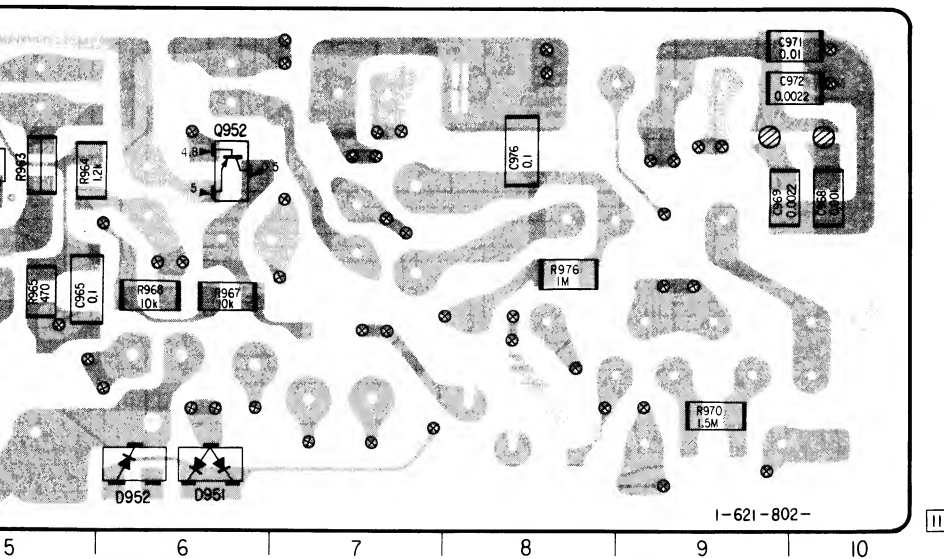
VF-10 BOARD (SOLDER SIDE)



LD-7 BOARD (SOLDER SIDE)

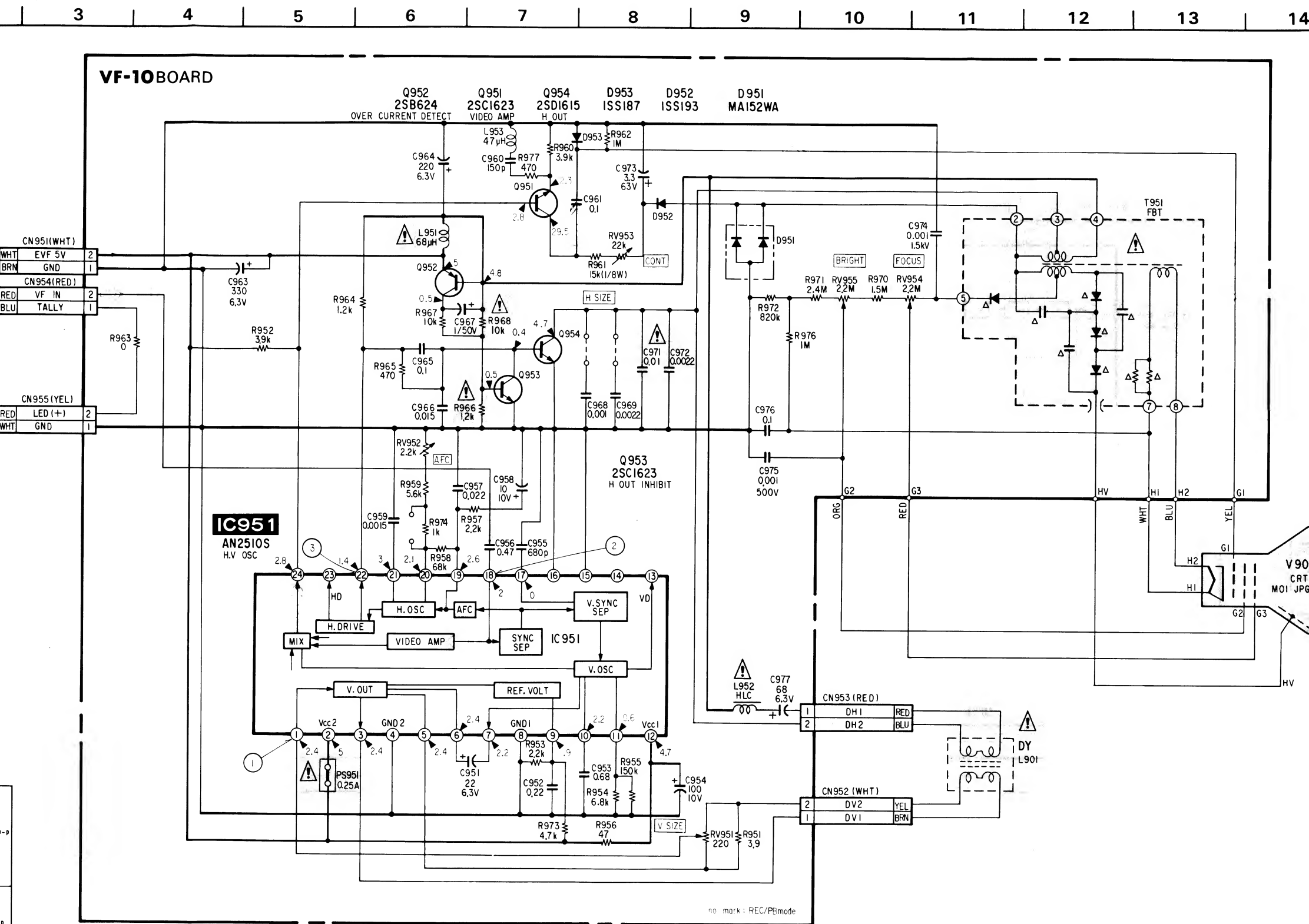


1	2	3	4	5	6	7	8	9
---	---	---	---	---	---	---	---	---




## D) SCHEMATIC DIAGRAM

DS : 7,000 series—







• Signal path

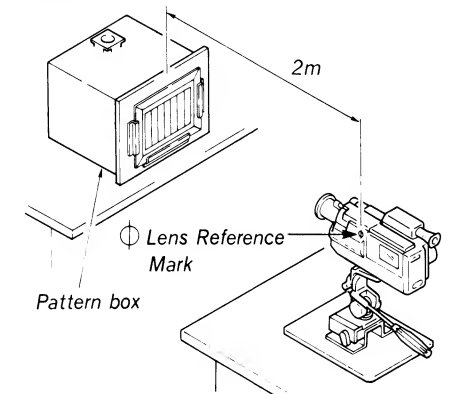
Note: The components identified by shading and mark  are critical for safety. Replace only with part number specified.

When indicating parts by reference number, please include the board name.

## Note:

- Caution when replacing chip parts.  
New parts must be attached after removal of chip.  
Be careful not to heat the minus side of tantalum capacitor, because it is damaged by the heat.
- All resistors are in ohms, 1/10W unless otherwise noted.
- All capacitors are in  $\mu\text{F}$  (p:pF) unless otherwise noted.  
50V or less are not indicated except for electrolytic capacitors.
- All variable and semi fixed resistors have characteristic curve B, unless otherwise noted.
-  : panel designation.
-  : Nonflammable resistor
-  : B+ bus.
-  : adjustment for repair.
- Voltage and waveform measuring conditions:  
(1) Sample object: Pattern box colour bars.  
(2) Voltage values: Relative to ground, measured with a DC digital multimeter (impedance 10M-ohm or more).

## 1. Connection



- Adjust the zooming of camera and the tripod so that the output waveform of Fig. a and the picture of Fig. b can be obtain.

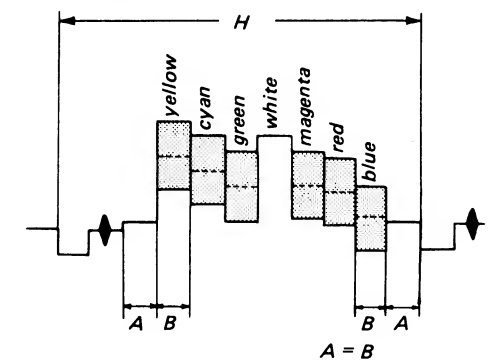


Fig. a Camera output waveform of No. ⑦ terminal of FP-81 flexible board.

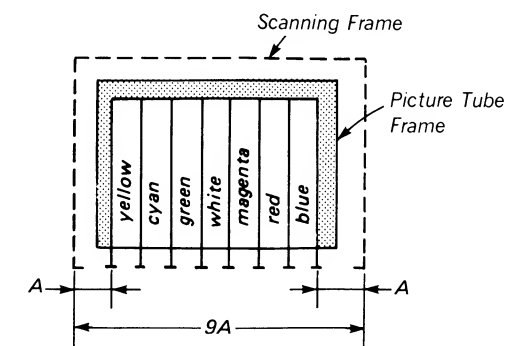


Fig. b Picture of TV monitor screen

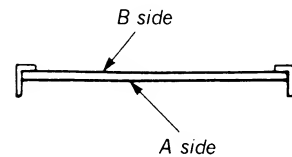


# CAMERA CAMERA

DT-61(CCD DRIVE, TIMING GENERATOR)PRINTED WIRING BOARDS

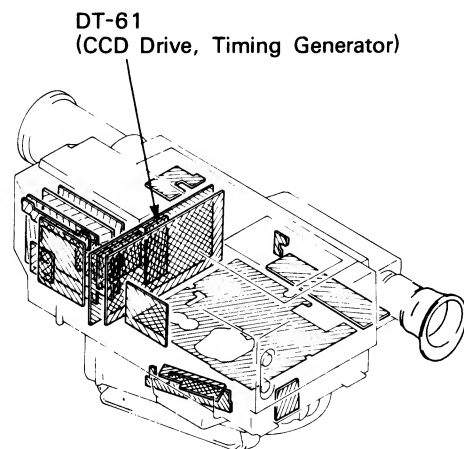
## Note:

- : indicates a lead wire mounted on the component side.
- : indicates a lead wire mounted on the printed side.
- ⊗ : Through hole.
- : Pattern from the side which enables seeing.
- : B+ pattern from the side which enables seeing.
- : Printed resistor.



## Note

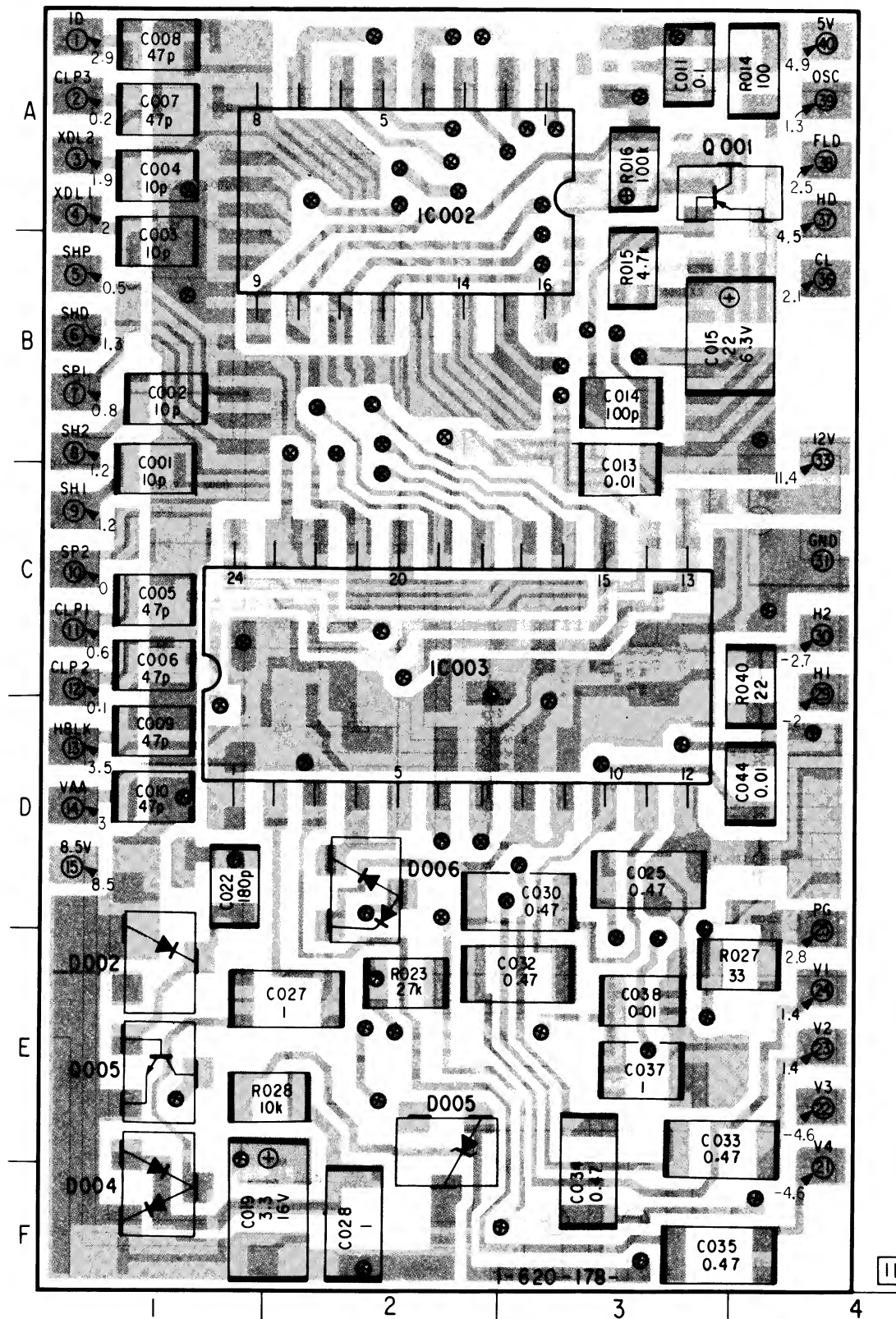
- Soldering side : Parts on the soldering side being (SIDE A) seen from the soldering are stated.
- Component side : Parts on the component side being (SIDE B) seen from the component are stated.
- Regarding color indication of patterns
- Patterns being seen in the state from the surface side are indicated in gray pattern and red pattern (B+ pattern).
  - Pattern being seen in the state of the rear surface side is indicated in green pattern.



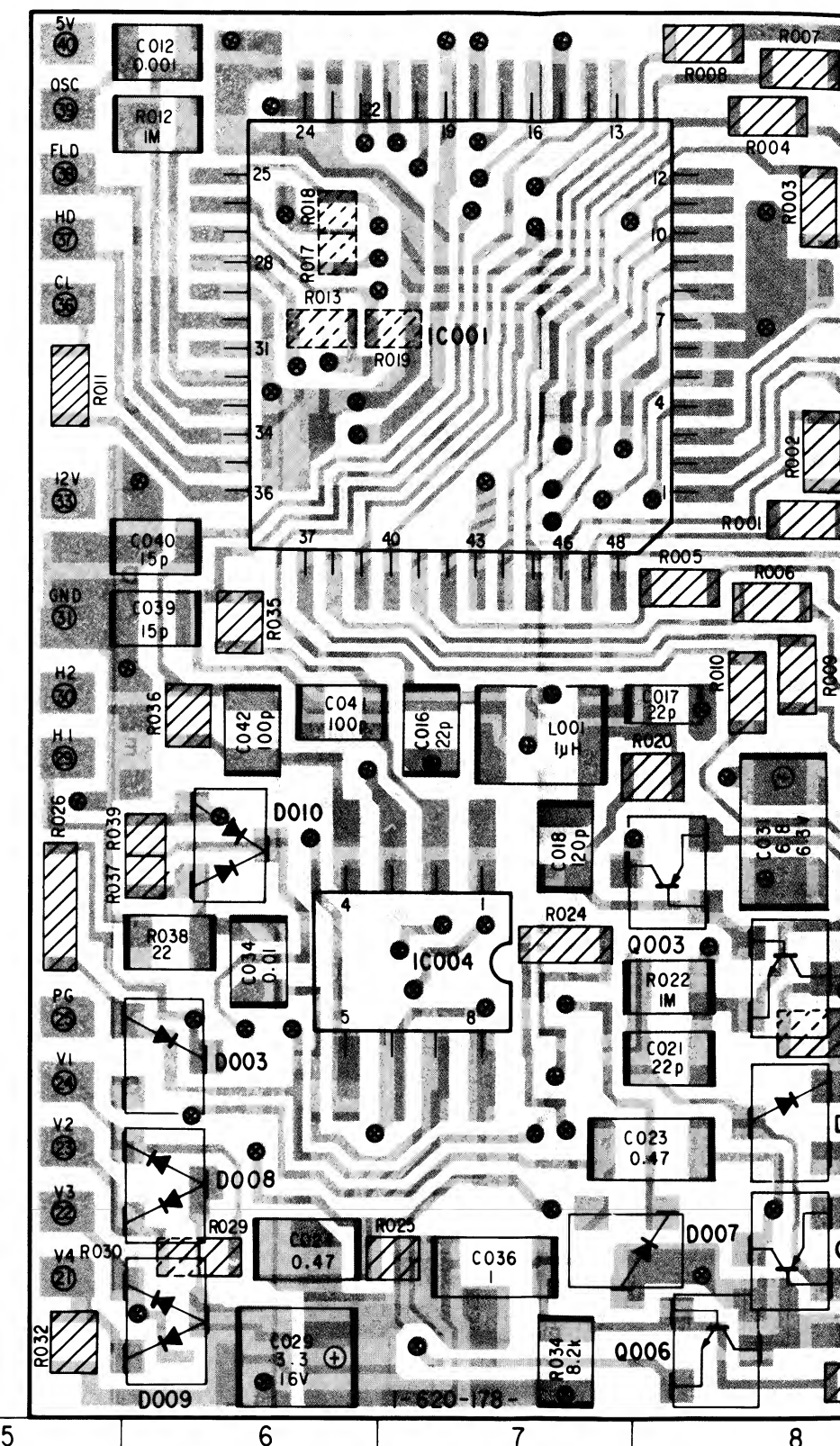
Be sure to always read "Note on replacing the CCD imager block" in page 86 when replacing the VC-20 complete board. DT-61 complete board and CCD imager block (IC701 on the VC-20 board and IC002 on the DT-61 board).

## DT-61 BOARD (SIDE B)

REC mode

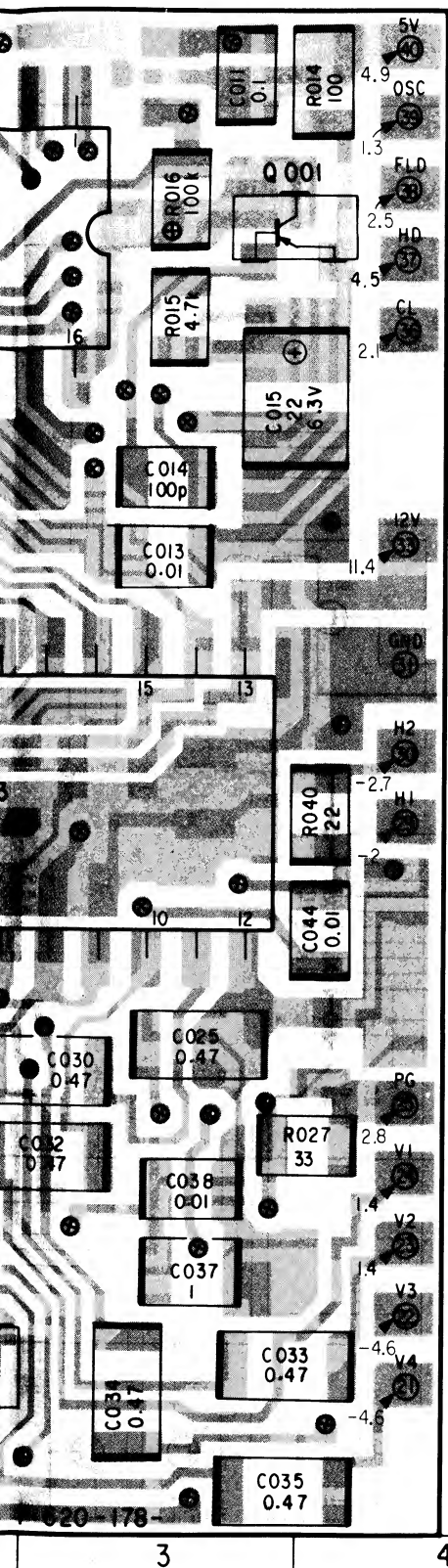


## DT-61 BOARD (SIDE A)

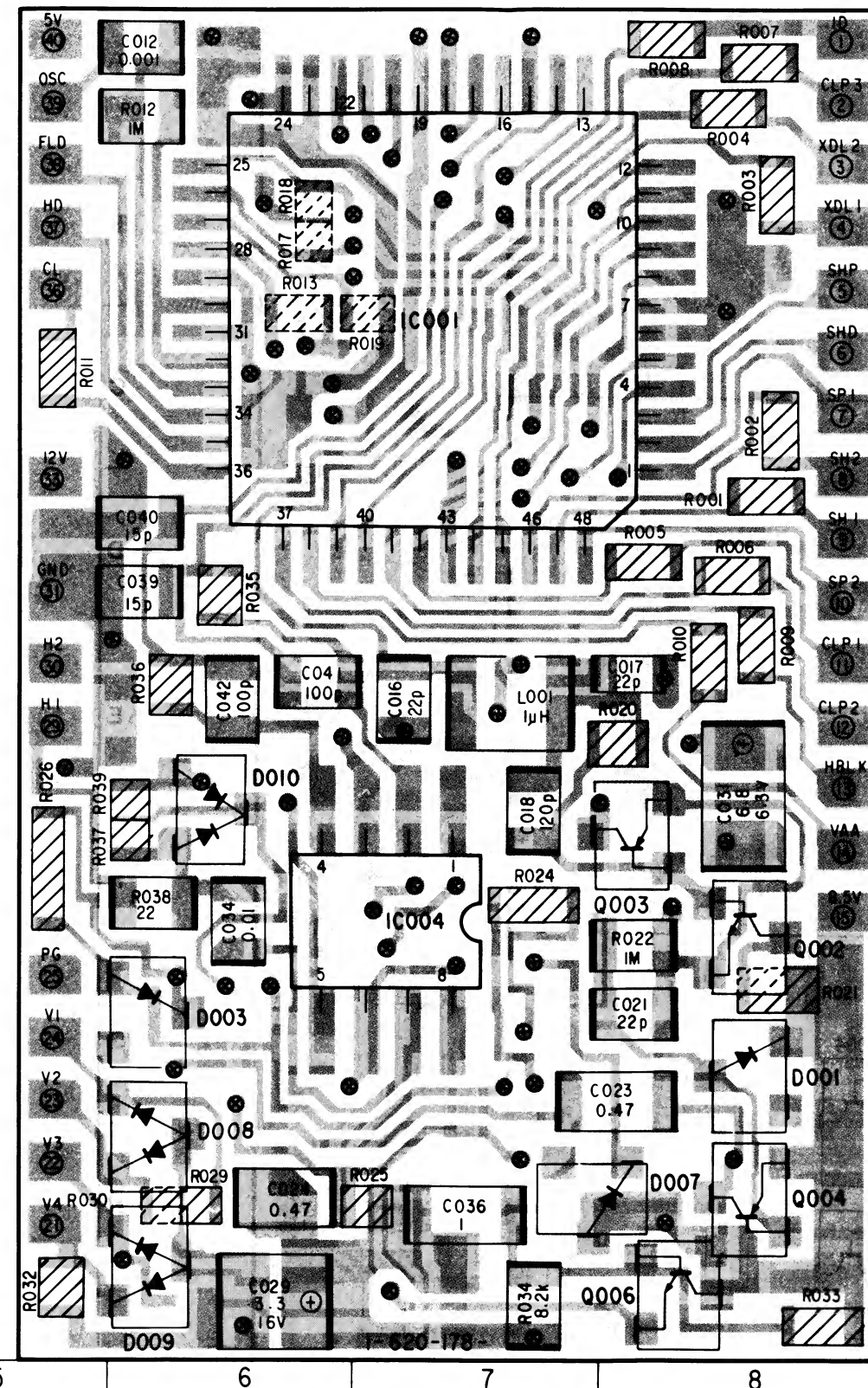




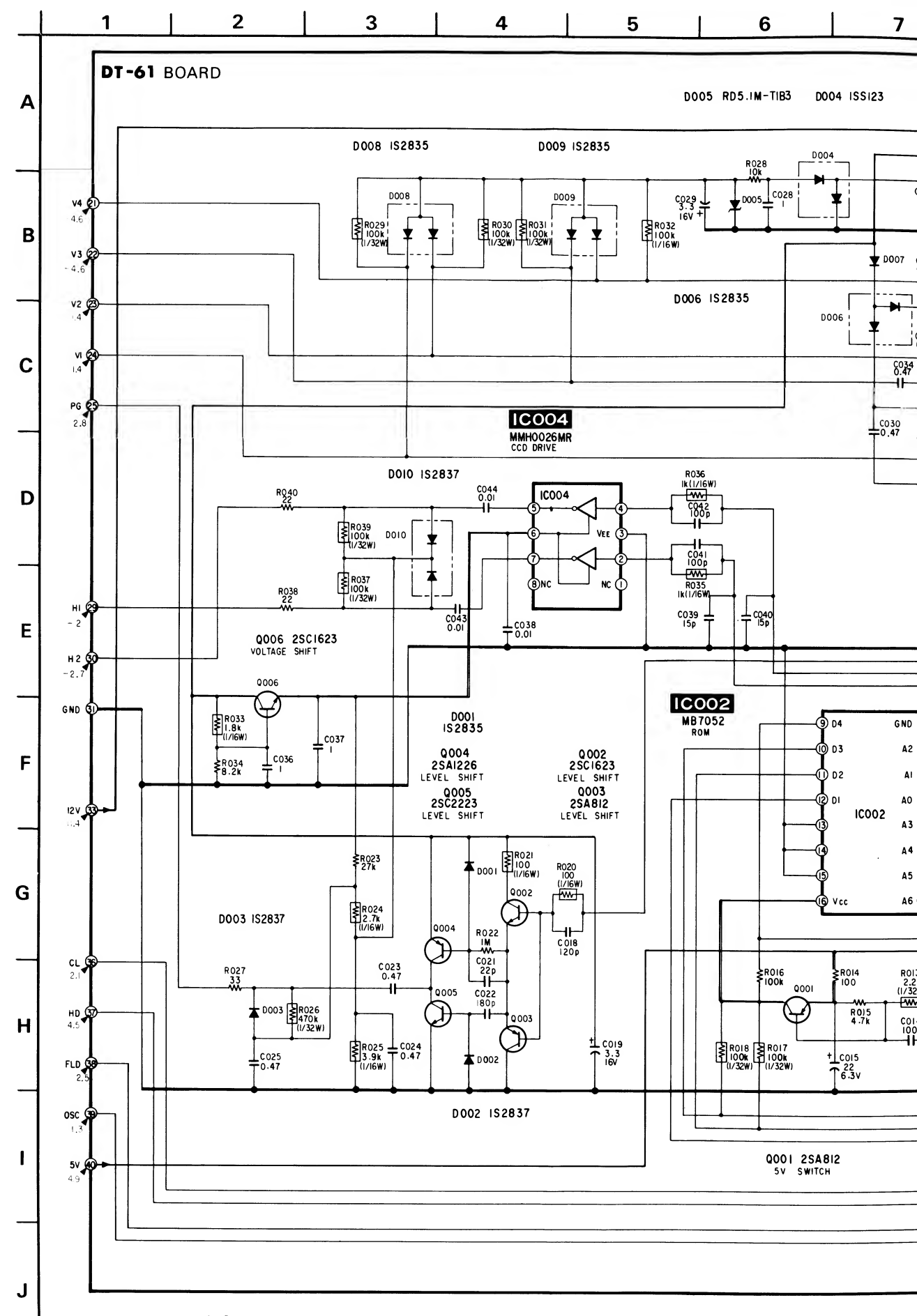
mode

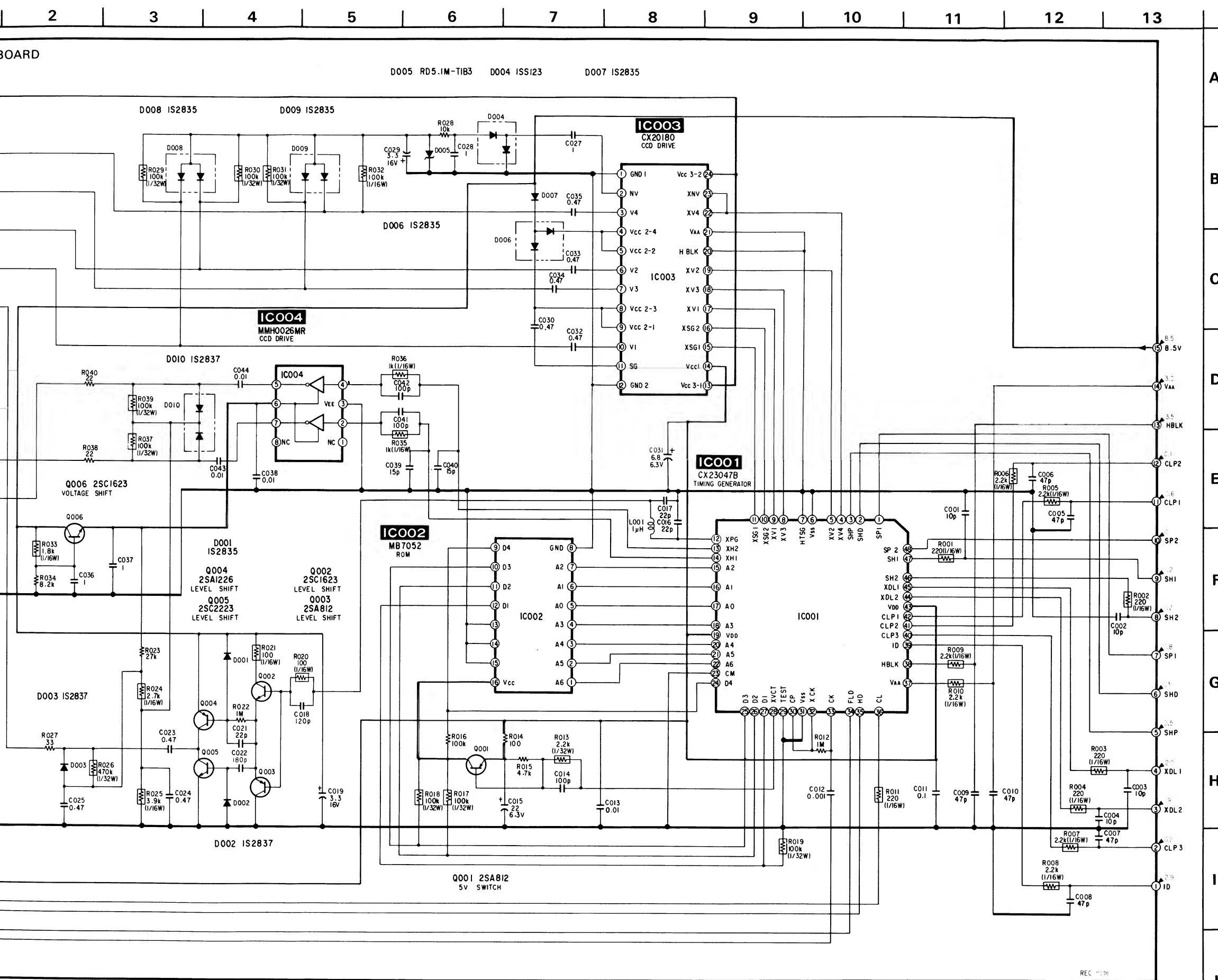


DT-61 BOARD (SIDE A)









DT-61(CCD DRIVE, TIMING GENERATOR)SCHEMATIC DIAGRAM

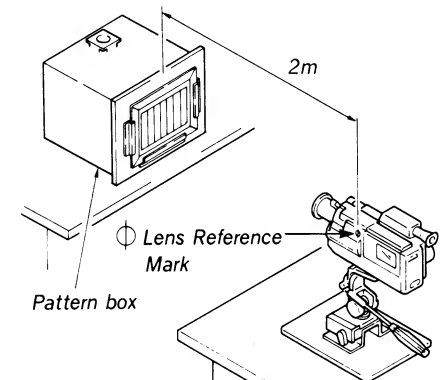




**Note:**

-  Caution when replacing chip parts.  
New parts must be attached after removal of chip.  
Be careful not to heat the minus side of tantalum capacitor, because it is damaged by the head.
- All resistors are in ohms, 1/10W unless otherwise noted.
- All capacitors are in  $\mu\text{F}$  (p:pF) unless otherwise noted.  
50V or less are not indicated except for electrolytic capacitors.
- All variable and semi fixed resistors have characteristic curve B, unless otherwise noted.
-  : panel designation.
-  : Nonflammable resistor
-  : printed resistor.
-  : B+ bus
-  : adjustment for repair
- Voltage and waveform measuring conditions:
  - (1) Sample object: Pattern box colour bars.
  - (2) Voltage values: Relative to ground, measured with a DC digital multimeter (impedance 10M-ohm or more).

## 1. Connection



2. Adjust the zooming of camera and the tripod so that the output waveform of Fig. a and the picture of Fig. b can be obtain,

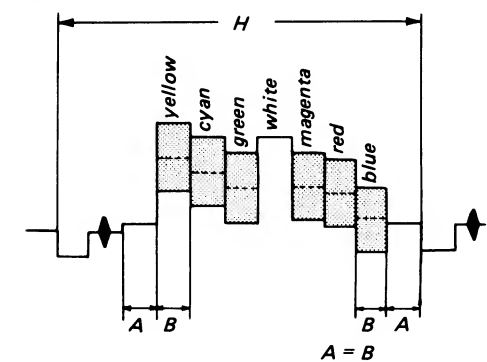


Fig.a Camera output waveform of No.⑦ terminal of FP-81 flexible board.

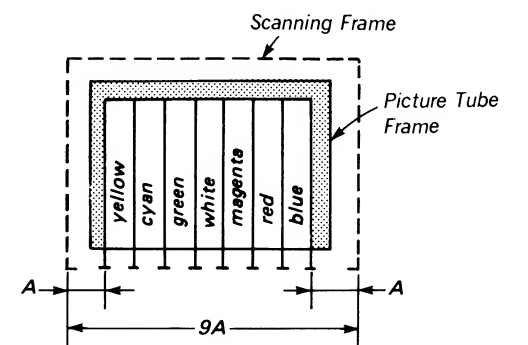



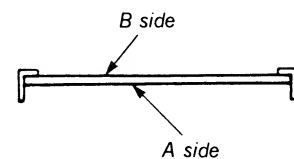


Fig. b Picture of TV monitor screen

**Note:**

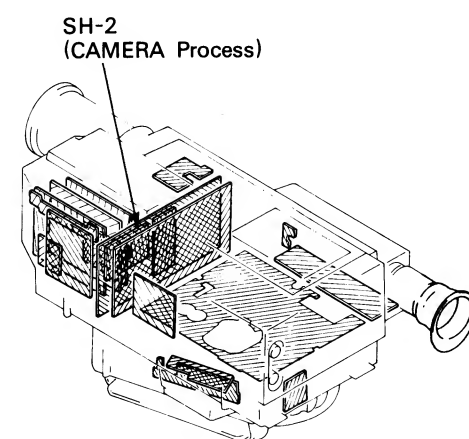
- ○ — : indicates a lead wire mounted on the component side.
- ● — : indicates a lead wire mounted on the printed side.
- ⊗ : Through hole.
-  : Pattern from the side which enables seeing.
-  : B+ pattern from the side which enables seeing.
-  : Printed resistor.



Note

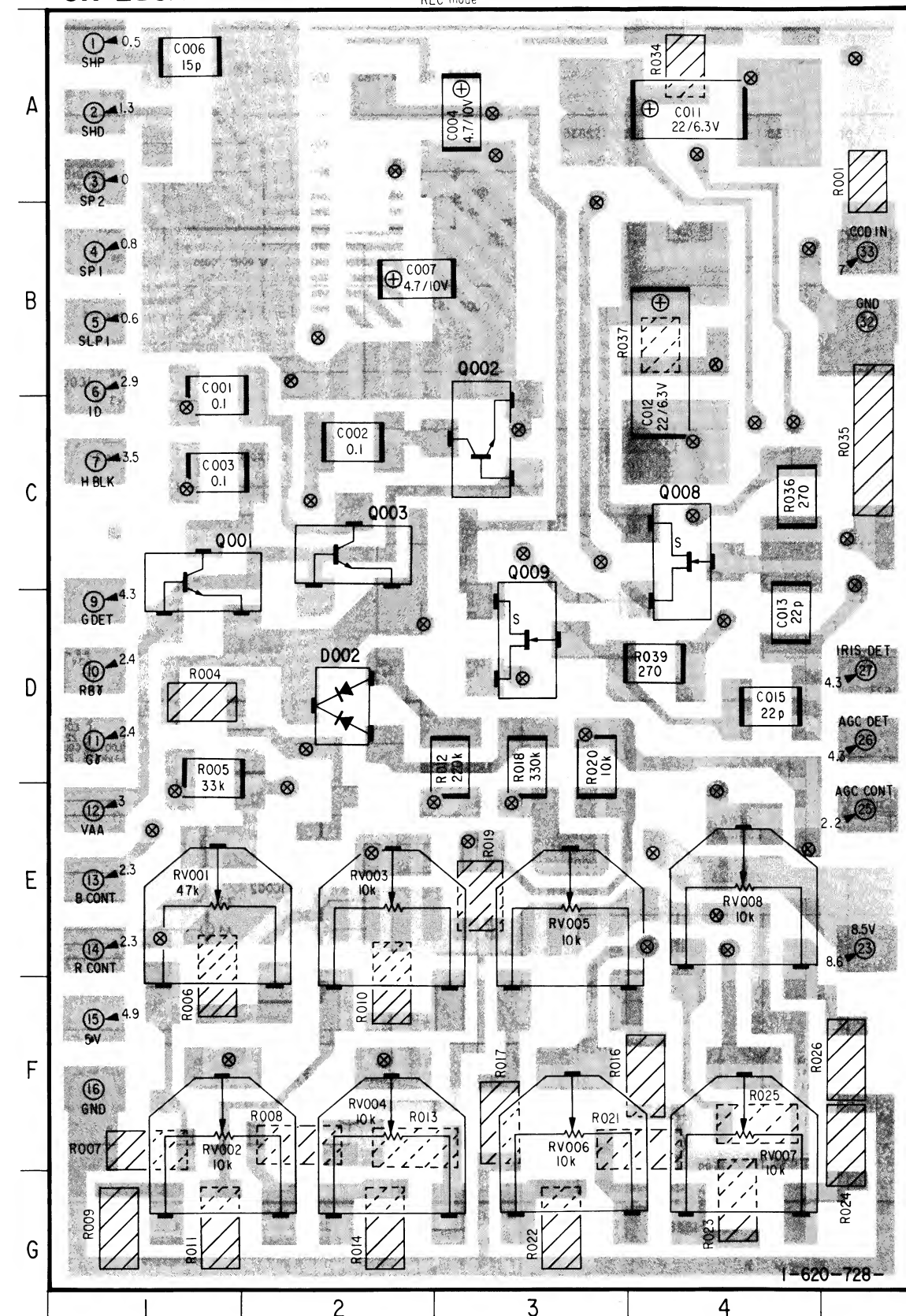
Soldering side : Parts on the soldering side being  
(SIDE A) seen from the soldering are stated.  
Component side : Parts on the component side being  
(SIDE B) seen from the component are stated.  
Regarding color indication of patterns

- Patterns being seen in the state from the surface side are indicated in gray pattern and red pattern (B+ pattern).
- Pattern being seen in the state of the rear surface side is indicated in green pattern.



## SH-2 BOARD (SIDE B)

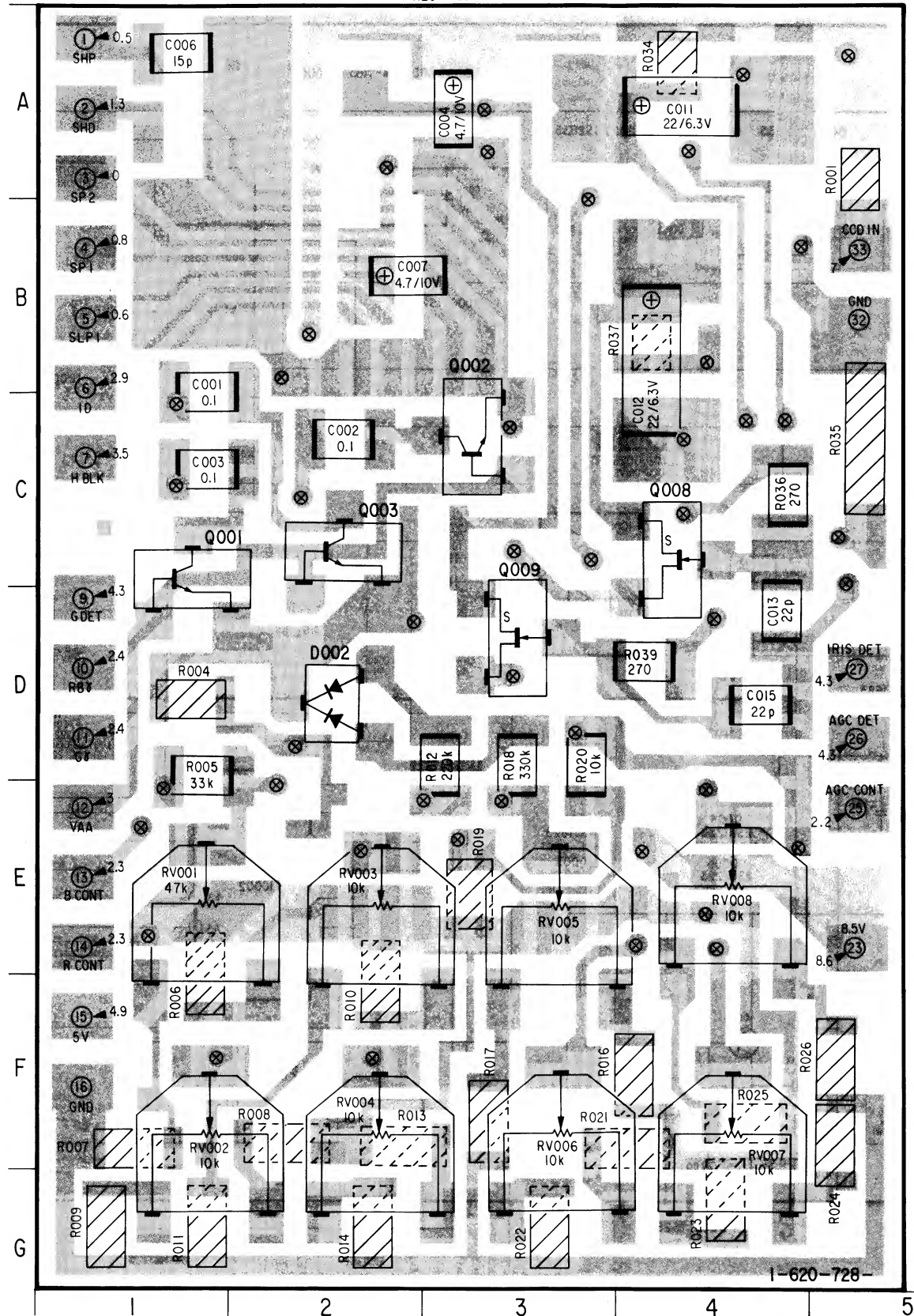
REC mode



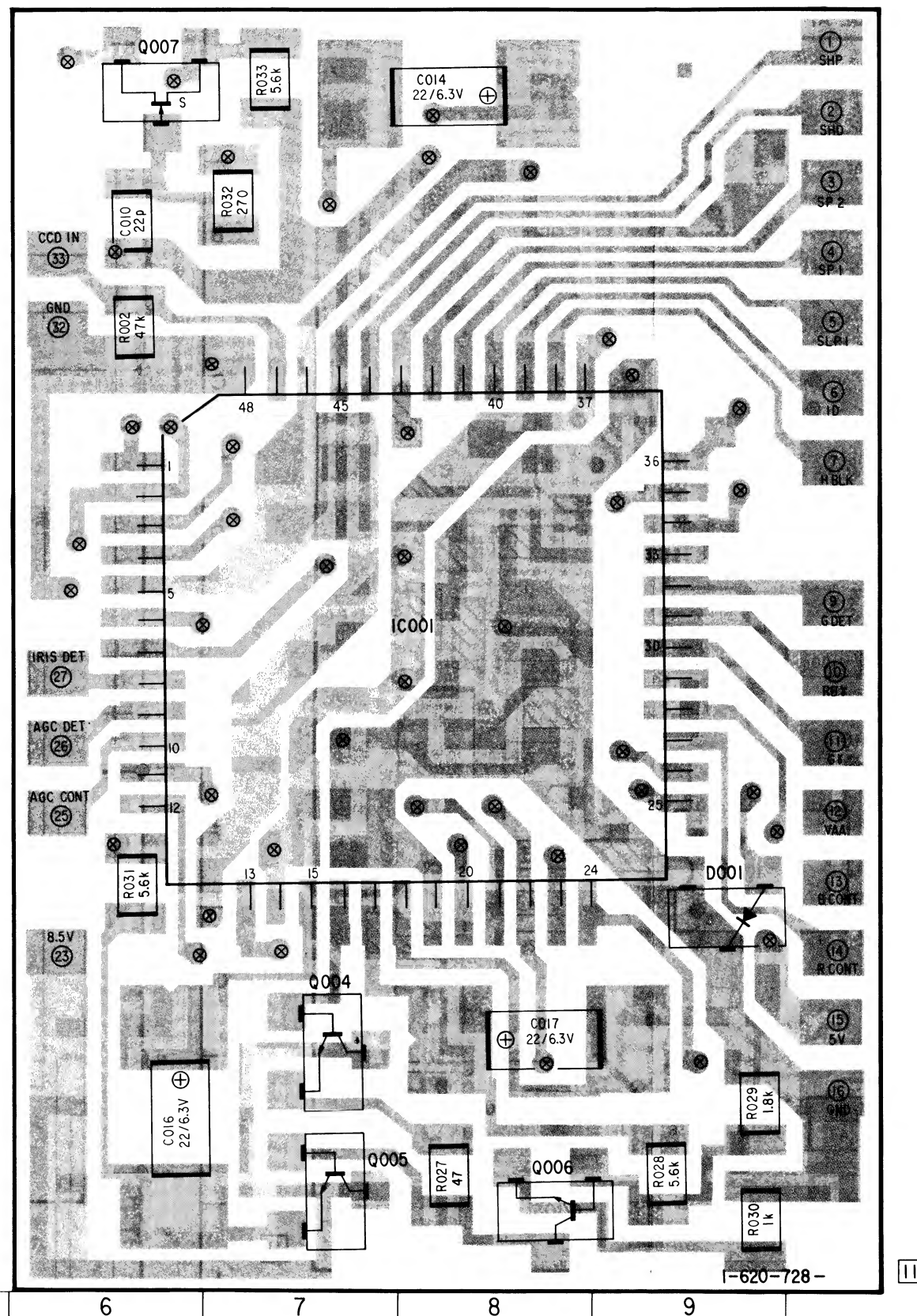


**SH-2 BOARD (SIDE B)**

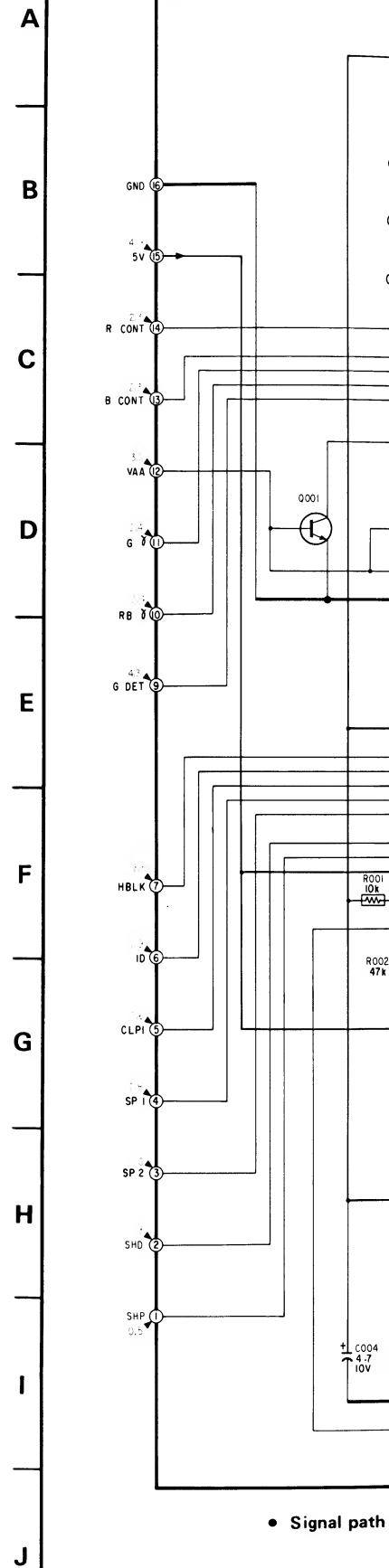
REC mode



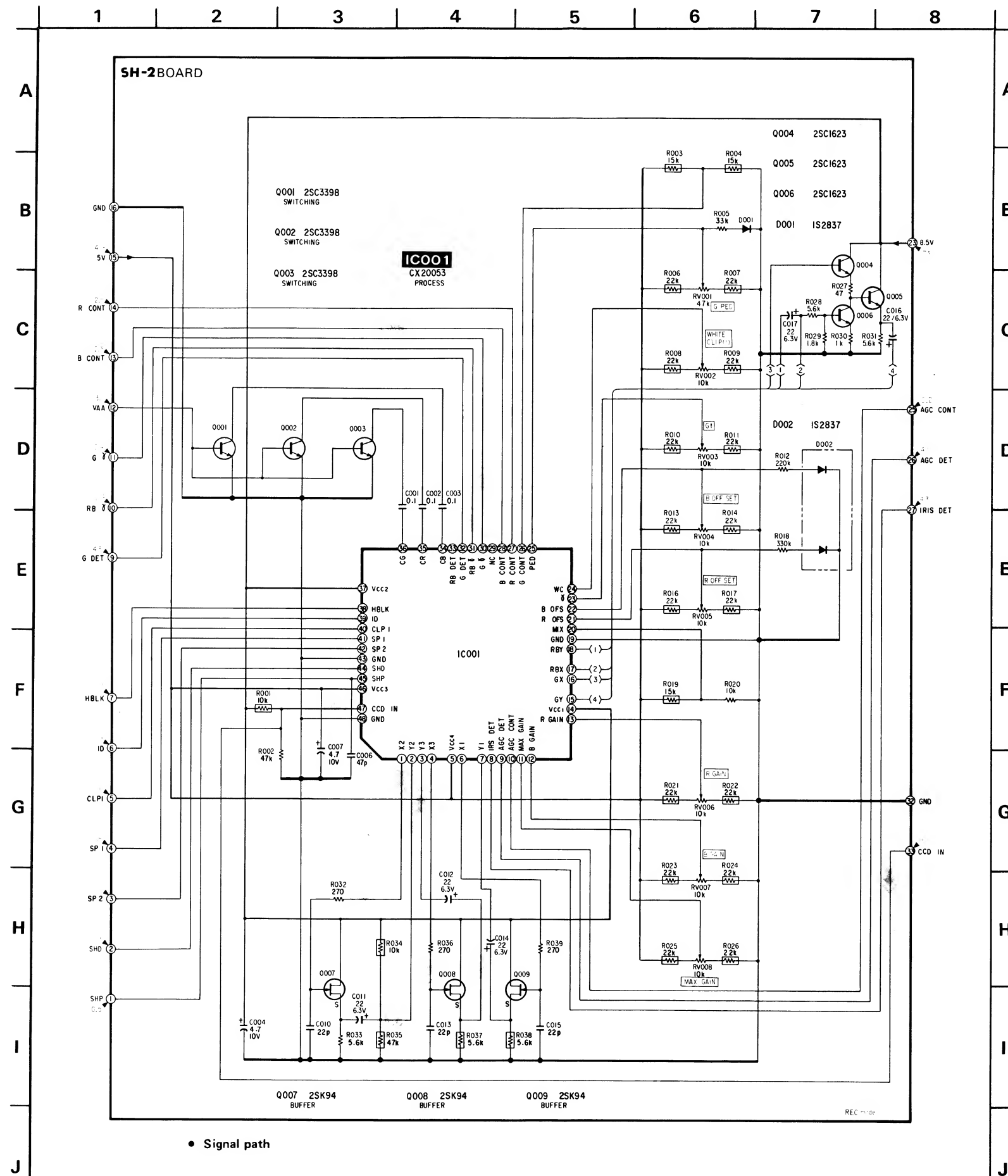
## SH-2 BOARD (SIDE A)








## 5H-2 BOARD



### SH-2(CAMERA PROCESS)SCHEMATIC DIAGRAM



—155—

- Caution when replacing chip parts.  
New parts must be attached after removal of chip.  
Be careful not to heat the minus side of tantalum capacitor, because it is damaged by the heat.
- All resistors are in ohms, 1/10W unless otherwise noted.
- All capacitors are in  $\mu\text{F}$  (p:pF) unless otherwise noted.  
50V or less are not indicated except for electrolytic capacitors.
- All variable and semi fixed resistors have characteristic curve B, unless otherwise noted.
-  : panel designation.
-  : Nonflammable resistor
-  : printed resistor.
-  : B+ bus.
-  : adjustment for repair.
- Voltage and waveform measuring conditions:
  - (1) Sample object: Pattern box colour bars.
  - (2) Voltage values: Relative to ground, measured with a DC digital multimeter (impedance 10M-ohm or more).

The diagram illustrates the experimental setup. A 'Pattern box' is positioned on a surface. A 'Lens Reference Mark' is indicated on the box. A camera system, consisting of a camera body and a lens, is mounted on a stand and aimed at the pattern box. A distance of '2m' is marked between the camera and the pattern box. The setup is used to measure the optical properties of the pattern box.

[illegible]

Scanning Frame

Picture Tube Frame

yellow  
cyan  
green  
white  
magenta  
red  
blue

$A$   $9A$   $A$

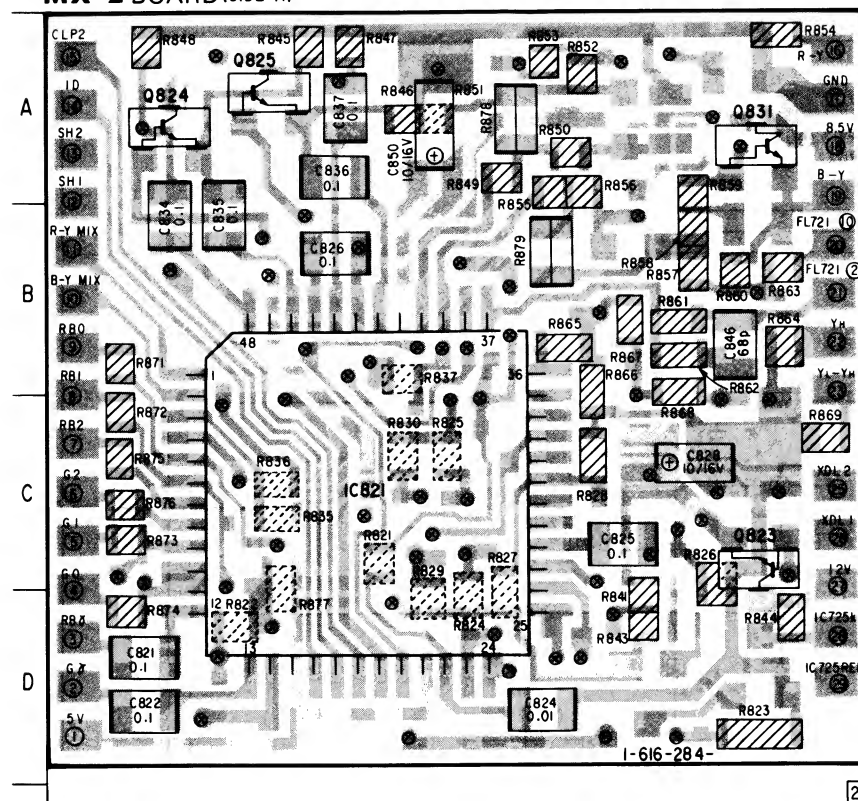
Fig. b Picture of TV monitor screen



# CAMERA CAMERA

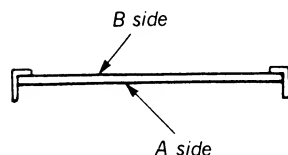
## MX-2(CAMERA MATRIX)PRINTED WIRING BOARD

### MX-2 BOARD(SIDE A)



#### Note:

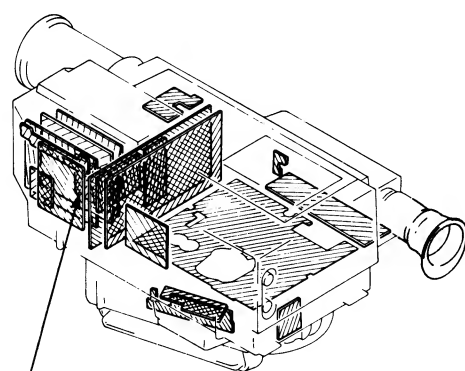
- : indicates a lead wire mounted on the component side.
- : indicates a lead wire mounted on the printed side.
- ⊗ : Through hole.
- : Pattern from the side which enables seeing.
- : Pattern of the rear surface.
- : B+ pattern from the side which enables seeing.



#### Note

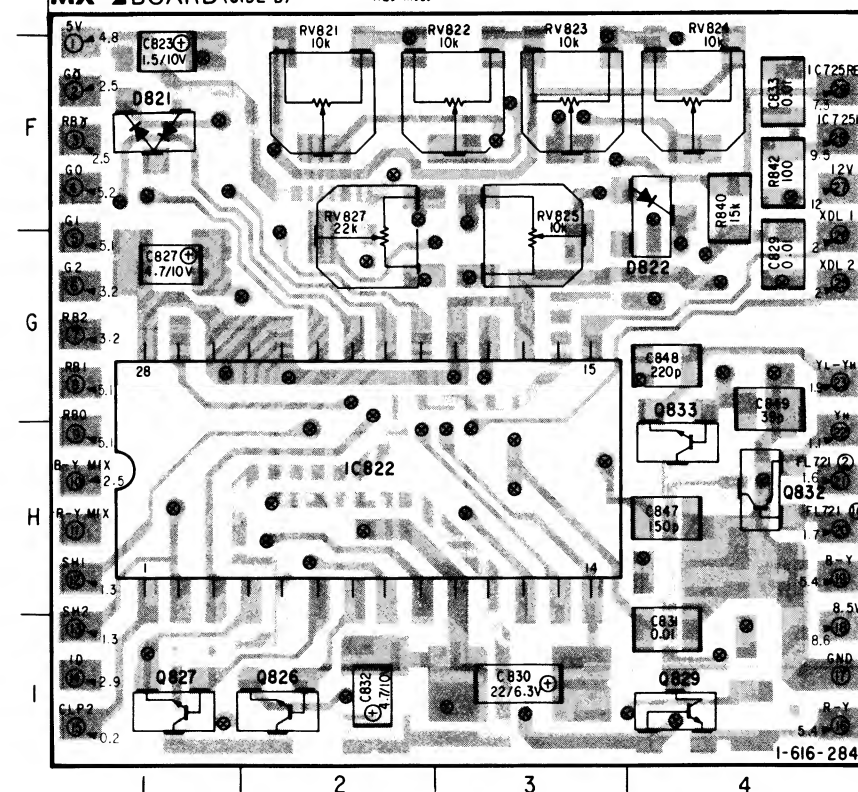
Soldering side : Parts on the soldering side being (SIDE A) seen from the soldering are stated.  
Component side : Parts on the component side being (SIDE B) seen from the component are stated.  
Regarding color indication of patterns

- Patterns being seen in the state from the surface side are indicated in gray pattern and red pattern (B+ pattern).
- Pattern being seen in the state of the rear surface side is indicated in green pattern.

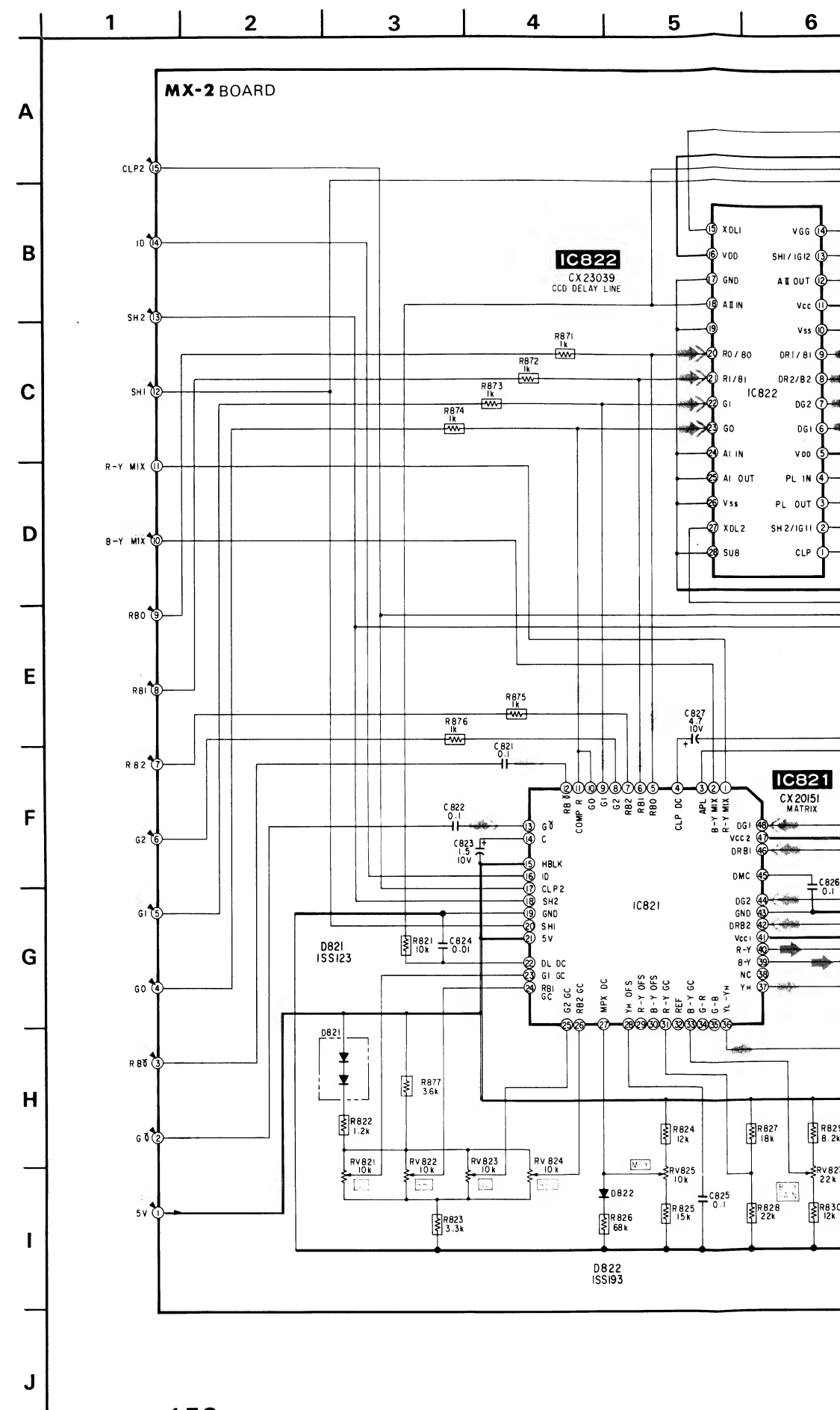


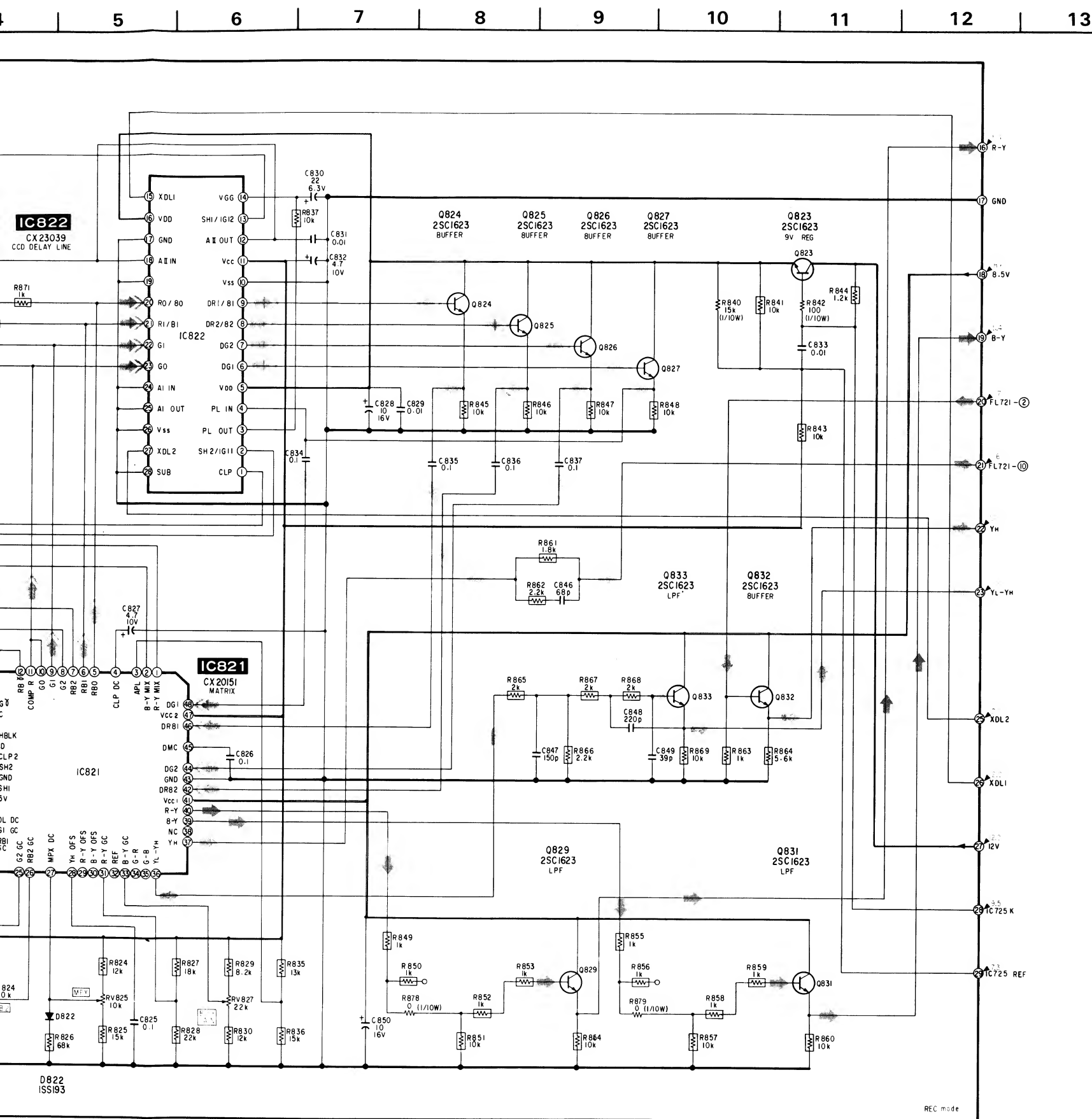
MX-2  
(CAMERA Matrix)

### MX-2 BOARD(SIDE B)



## MX-2(CAMERA MATRIX)SCHEMATIC DIAGRAM





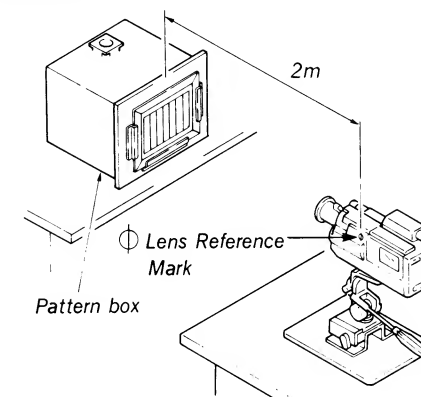
• Signal path

- REC + Signal
- REC CHROMA Signal
- REC Y CHROMA Signal

Note:

- Caution when replacing chip parts.  
New parts must be attached after removal of chip.  
Be careful not to heat the minus side of tantalum capacitor, because it is damaged by the head.
- All resistors are in ohms, 1/10W unless otherwise noted.
- All capacitors are in  $\mu\text{F}$  (p:pF) unless otherwise noted.  
50V or less are not indicated except for electrolytic capacitors.
- All variable and semi fixed resistors have characteristic curve B, unless otherwise noted.
- : panel designation.
- : Nonflammable resistor
- : printed resistor.
- : B+ bus
- : adjustment for repair.
- Voltage and waveform measuring conditions:  
(1) Sample object: Pattern box colour bars.  
(2) Voltage values: Relative to ground, measured with a DC digital multimeter (impedance 10M-ohm or more).

1. Connection



2. Adjust the zooming of camera and the tripod so that the output waveform of Fig. a and the picture of Fig. b can be obtain.

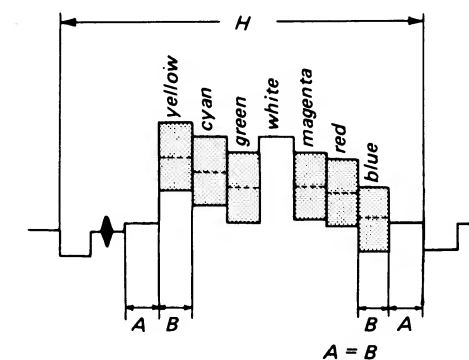


Fig.a Camera output waveform of No.7 terminal of FP-81 flexible board.

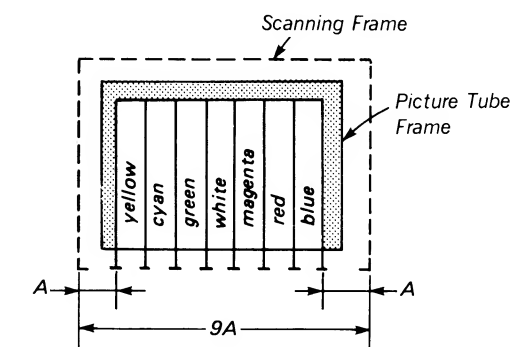
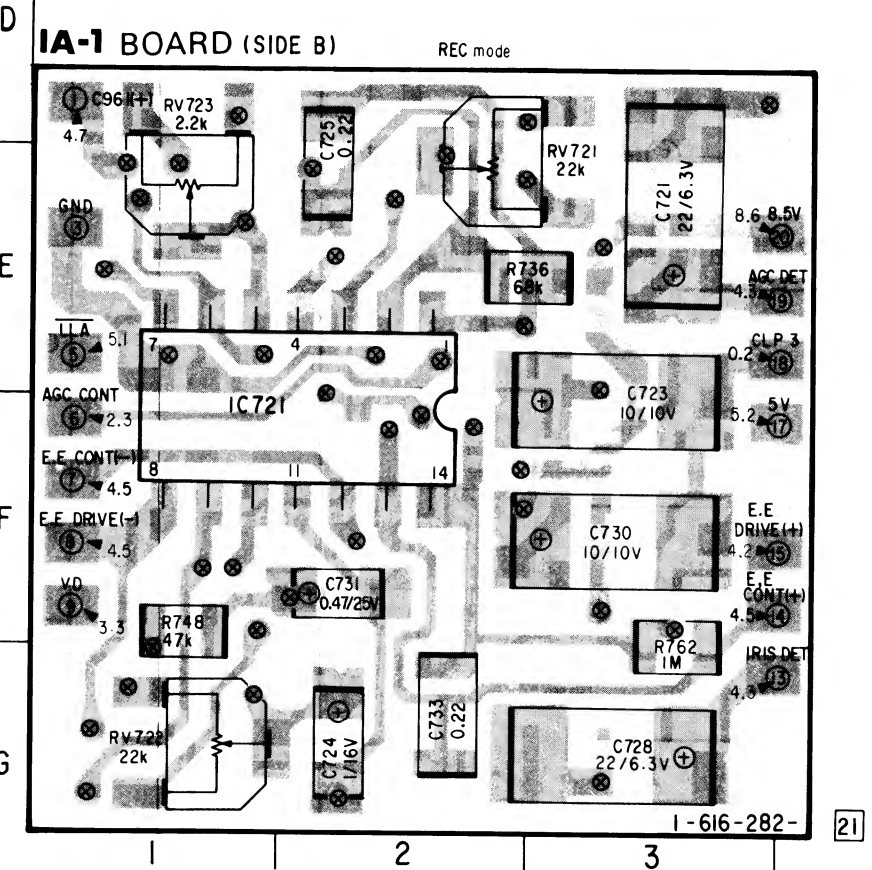
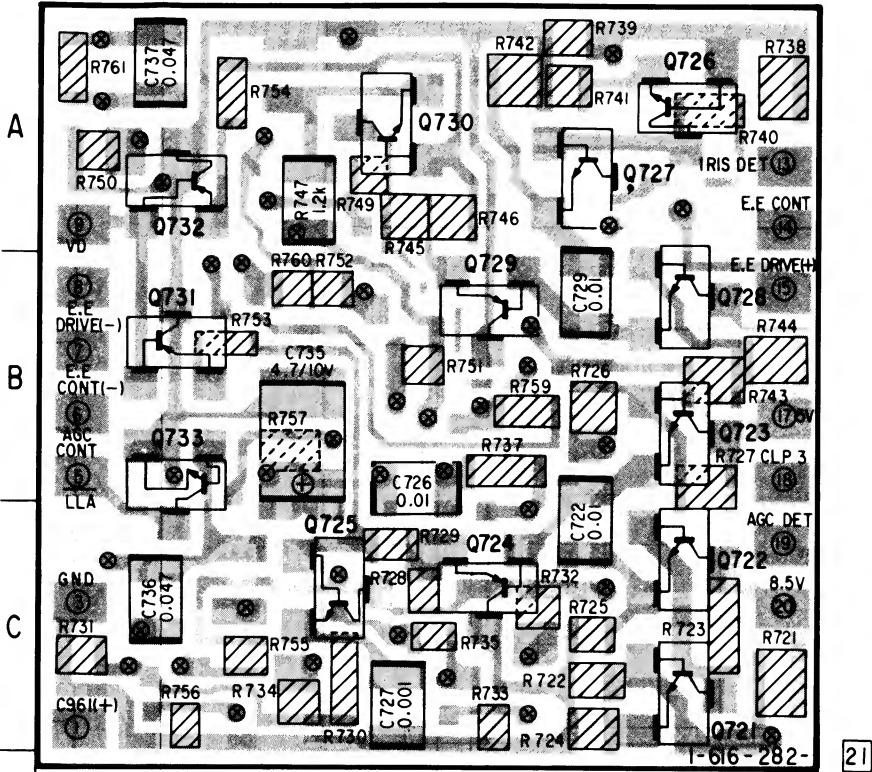


Fig. b Picture of TV monitor screen

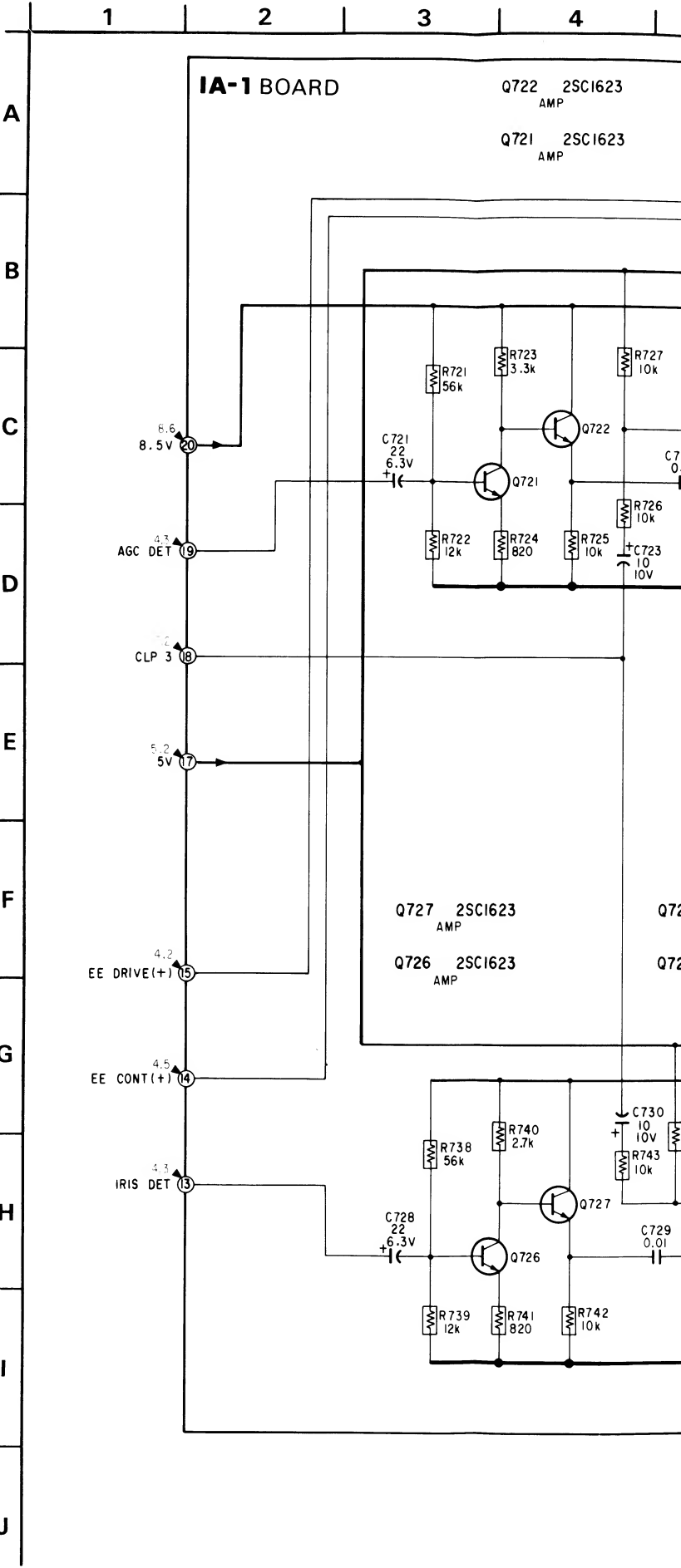
# CAMERA CAMERA

IA-1(IRIS/AGC CONTROL)PRINTED WIRING BOARD

IA-1 BOARD (SIDE A)

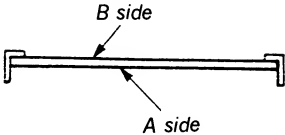


IA-1(IRIS/AGC CONTROL)SCHEMATIC DIAGRAM



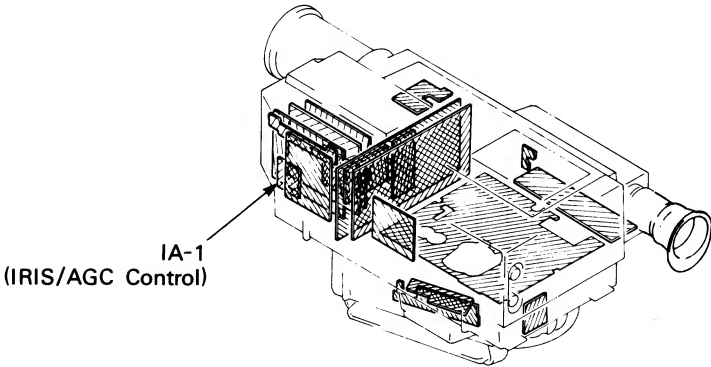
**Note:**

- : indicates a lead wire mounted on the component side.
- : indicates a lead wire mounted on the printed side.
- ⊗ : Through hole.
- : Pattern from the side which enables seeing.
- \* : Pattern of the rear side.
- : B+ pattern from the side which enables seeing.
- ▨ : Printed resistor.

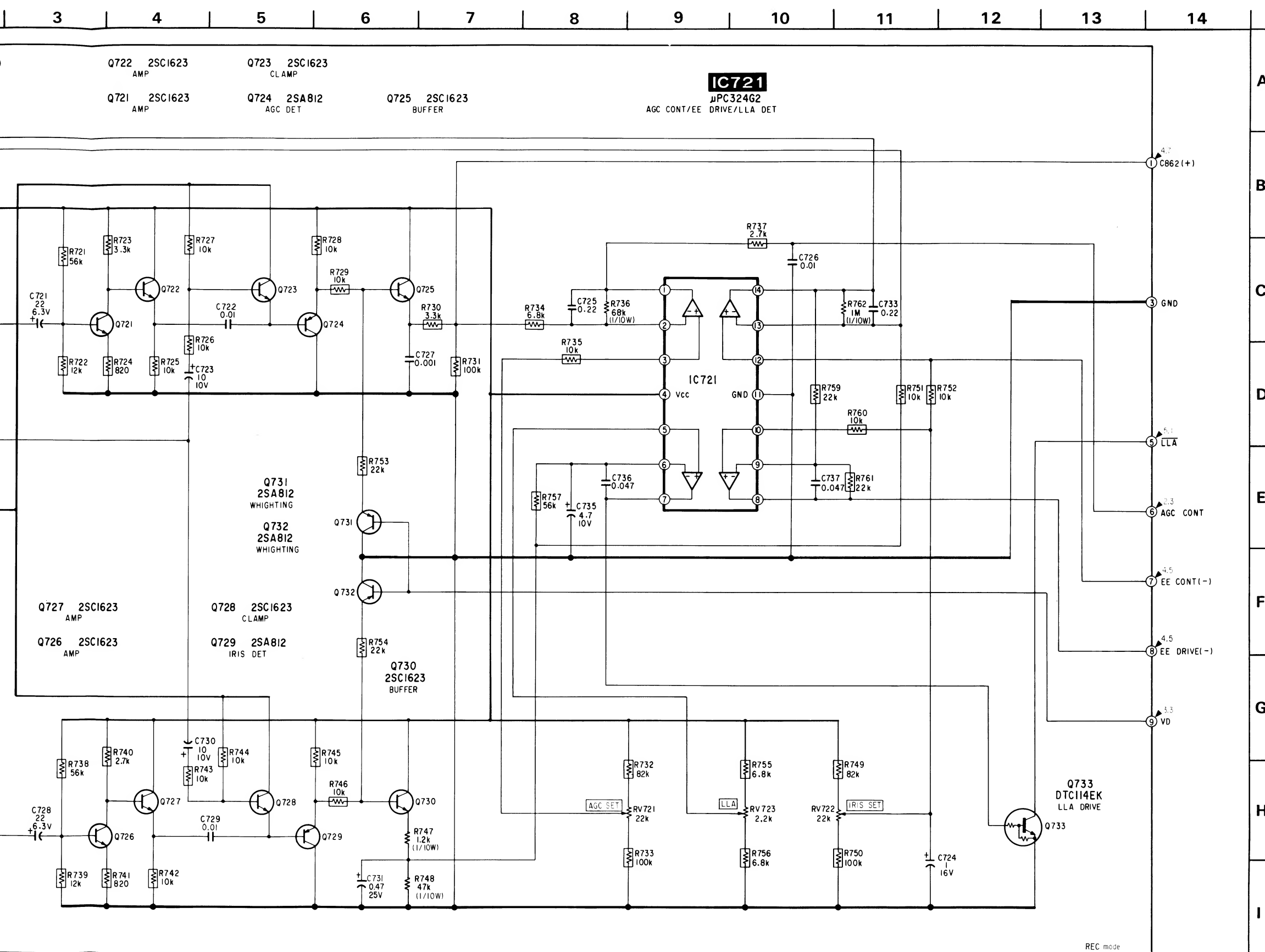


**Note**

Soldering side : Parts on the soldering side being (SIDE A) seen from the soldering are stated.  
 Component side : Parts on the component side being (SIDE B) seen from the component are stated.  
 Regarding color indication of patterns  
 ● Patterns being seen in the state from the surface side are indicated in gray pattern and red pattern (B+pattern).  
 ● Pattern being seen in the state of the rear surface side is indicated in green pattern.



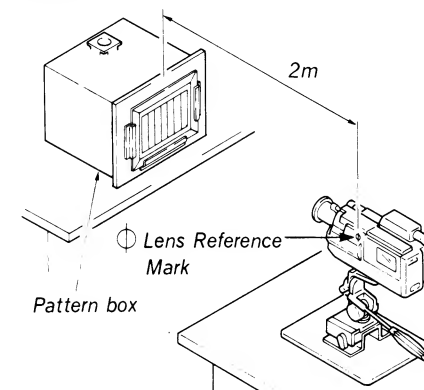




## Note:

- Caution when replacing chip parts.  
New parts must be attached after removal of chip.  
Be careful not to heat the minus side of tantalum capacitor, because it is damaged by the head.
- All resistors are in ohms, 1/10W unless otherwise noted.
- All capacitors are in  $\mu\text{F}$  (p:pF) unless otherwise noted.  
50V or less are not indicated except for electrolytic capacitors.
- All variable and semi fixed resistors have characteristic curve B, unless otherwise noted.
- : panel designation.
- : Nonflammable resistor
- : printed resistor.
- : B+ bus.
- : adjustment for repair.
- Voltage and waveform measuring conditions:  
(1) Sample object: Pattern box colour bars.  
(2) Voltage values: Relative to ground, measured with a DC digital multimeter (impedance 10M-ohm or more).

## 1. Connection



2. Adjust the zooming of camera and the tripod so that the output waveform of Fig. a and the picture of Fig. b can be obtain.

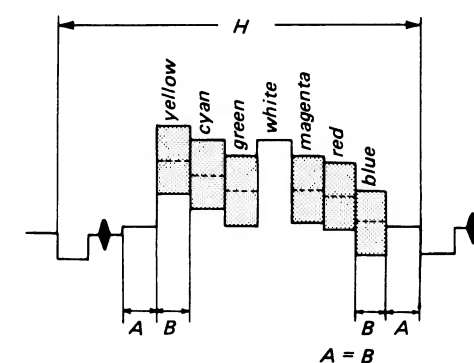


Fig. a Camera output waveform of No. ⑦ terminal of FP-81 flexible board.

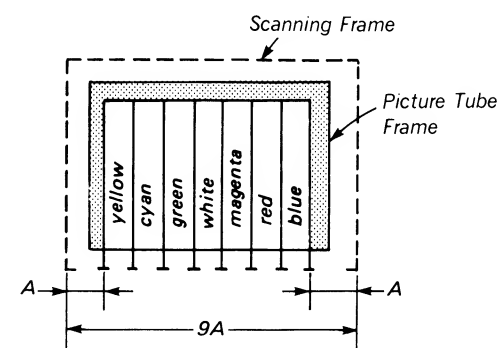


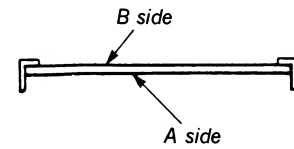
Fig. b Picture of TV monitor screen

### RP-34 BOARD (SIDE B)

no mark : RECmode  
( ) : PB mode

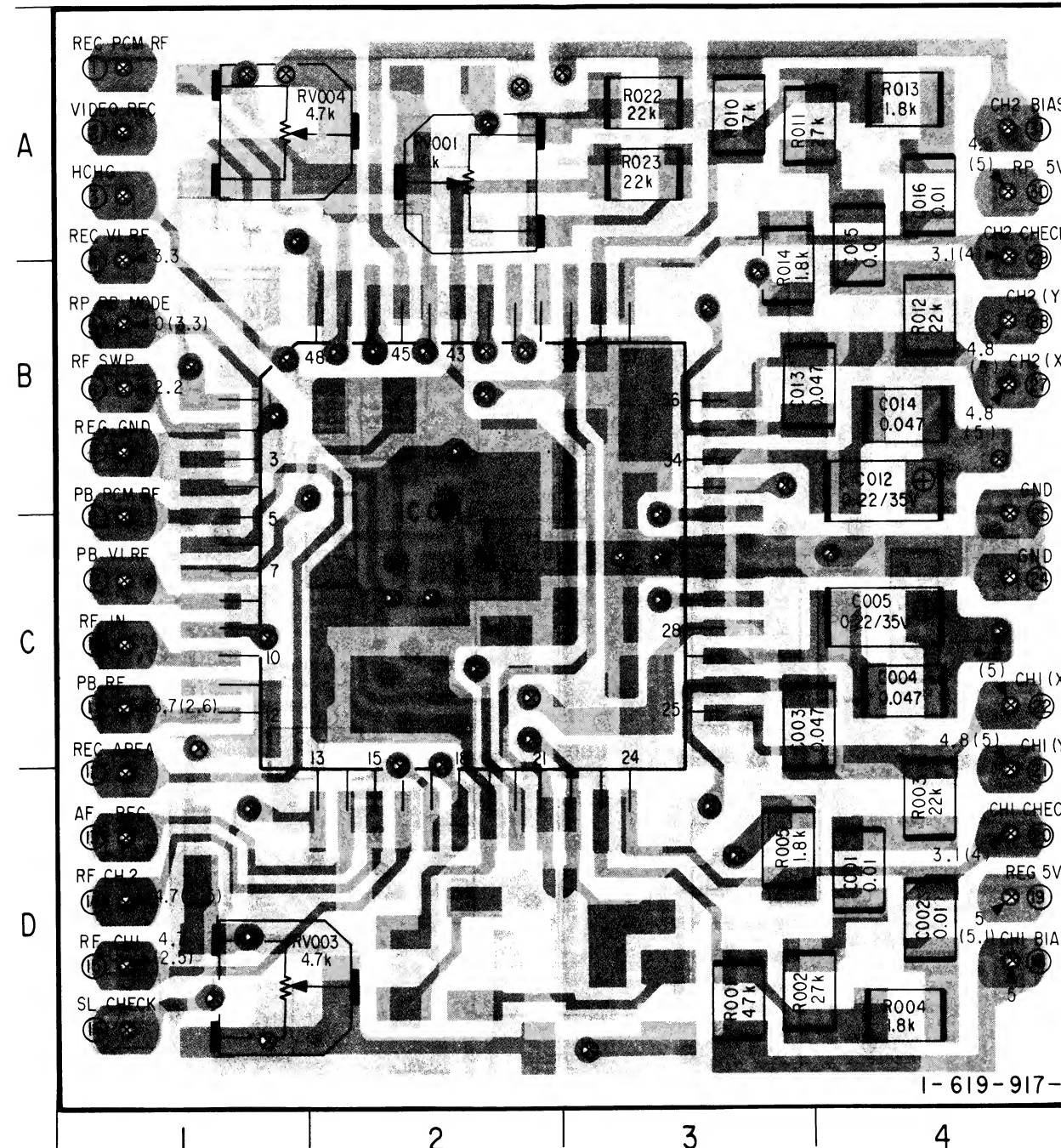
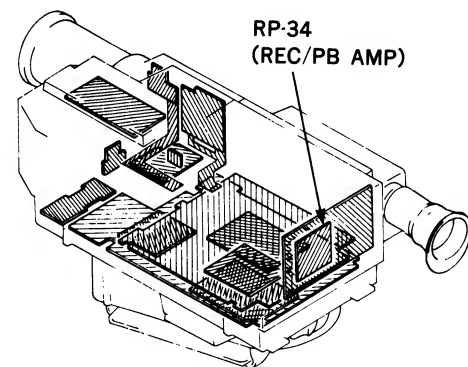
#### Note:

- — : indicates a lead wire mounted on the component side.
- — : indicates a lead wire mounted on the printed side.
- ⊗ : Through hole.
- : Pattern from the side which enables seeing.
- : Pattern of the rear side.
- : B+ pattern from the side which enables seeing.

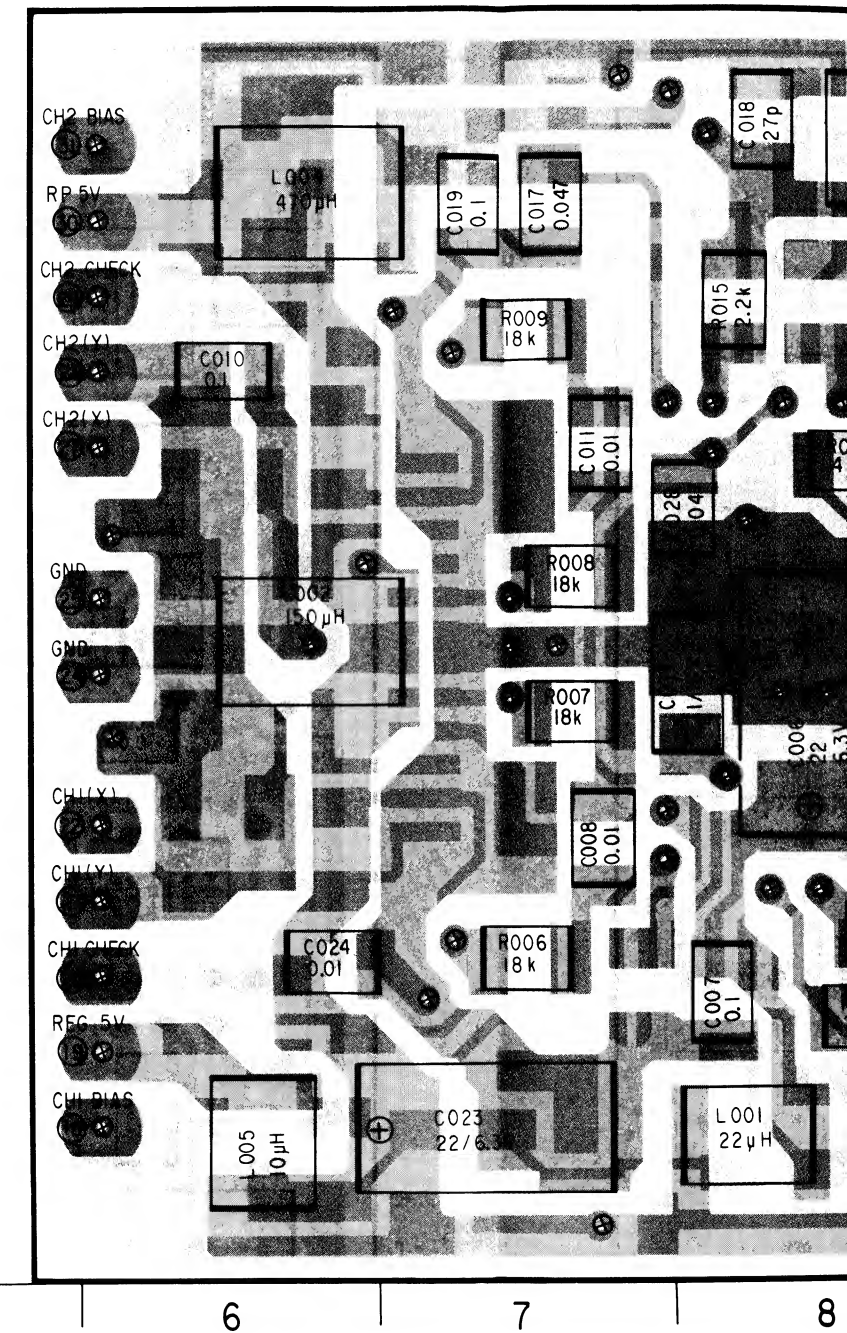


#### Note

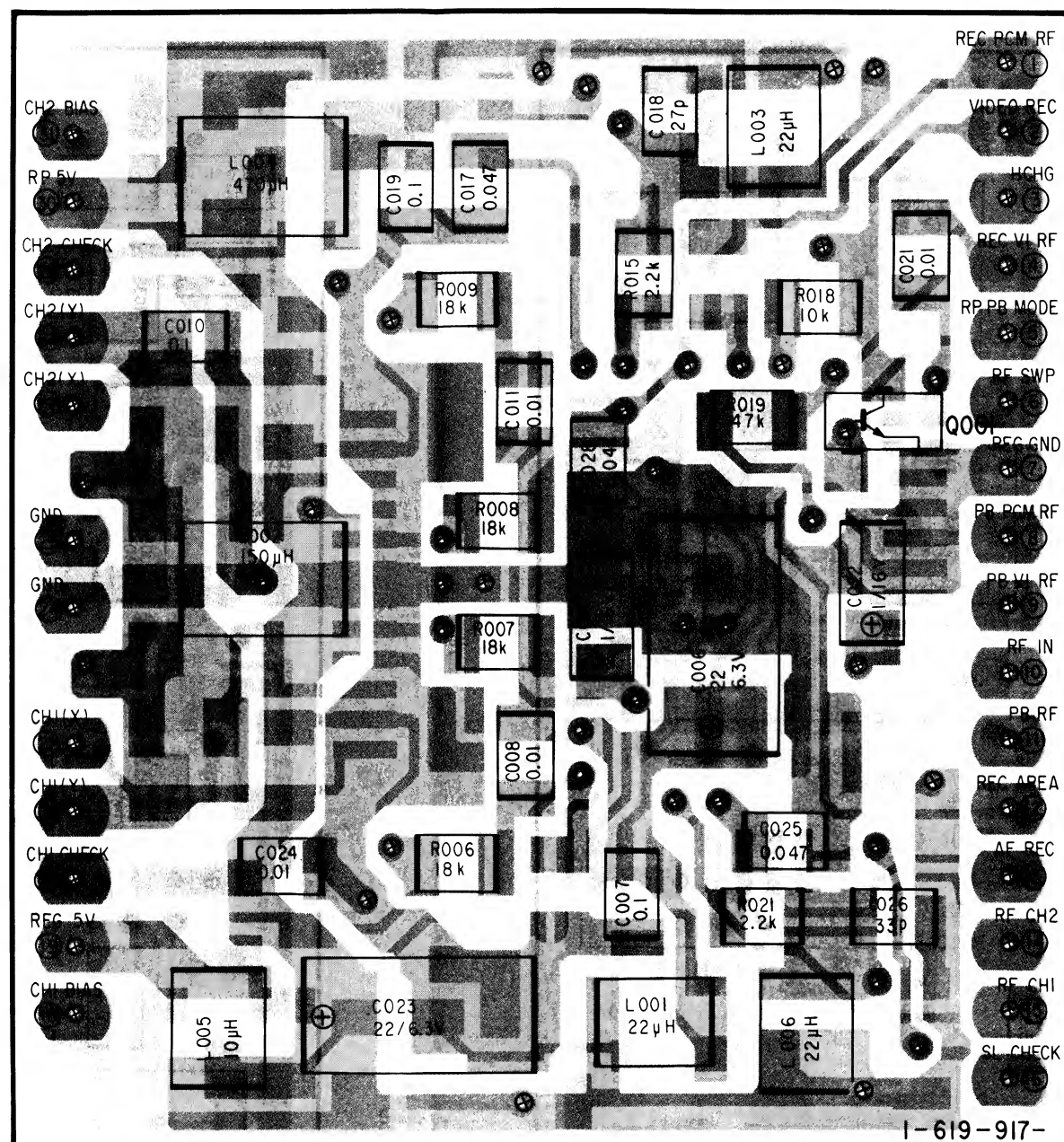
- Soldering side : Parts on the soldering side being (SIDE A) seen from the soldering are stated.
- Component side : Parts on the component side being (SIDE B) seen from the component are stated.
- Regarding color indication of patterns
- Patterns being seen in the state from the surface side are indicated in gray pattern and red pattern (B+ pattern).
  - Pattern being seen in the state of the rear surface side is indicated in green pattern.



### RP-34 BOARD (SIDE A)

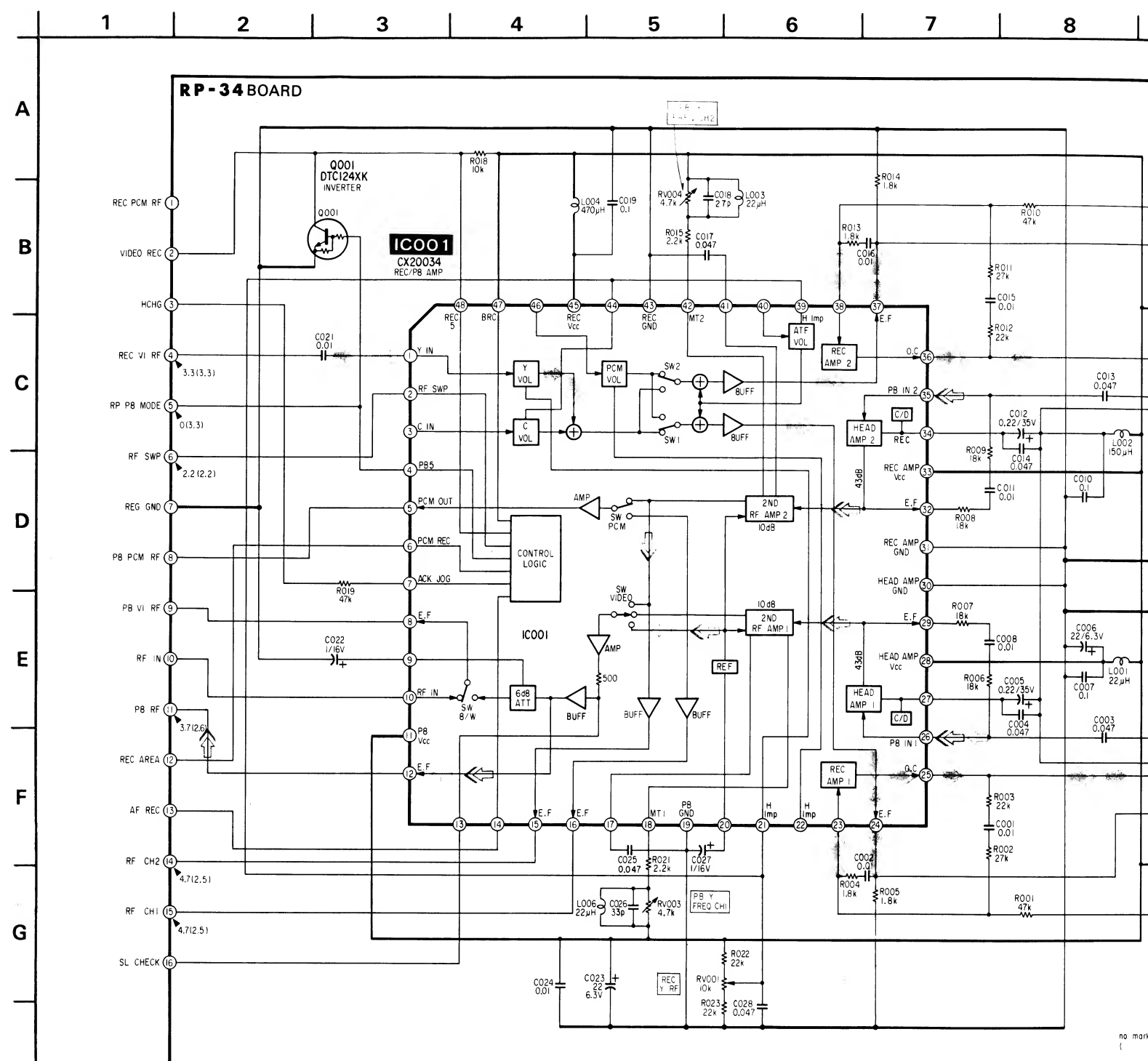


## 22



1-619-917-

## 22

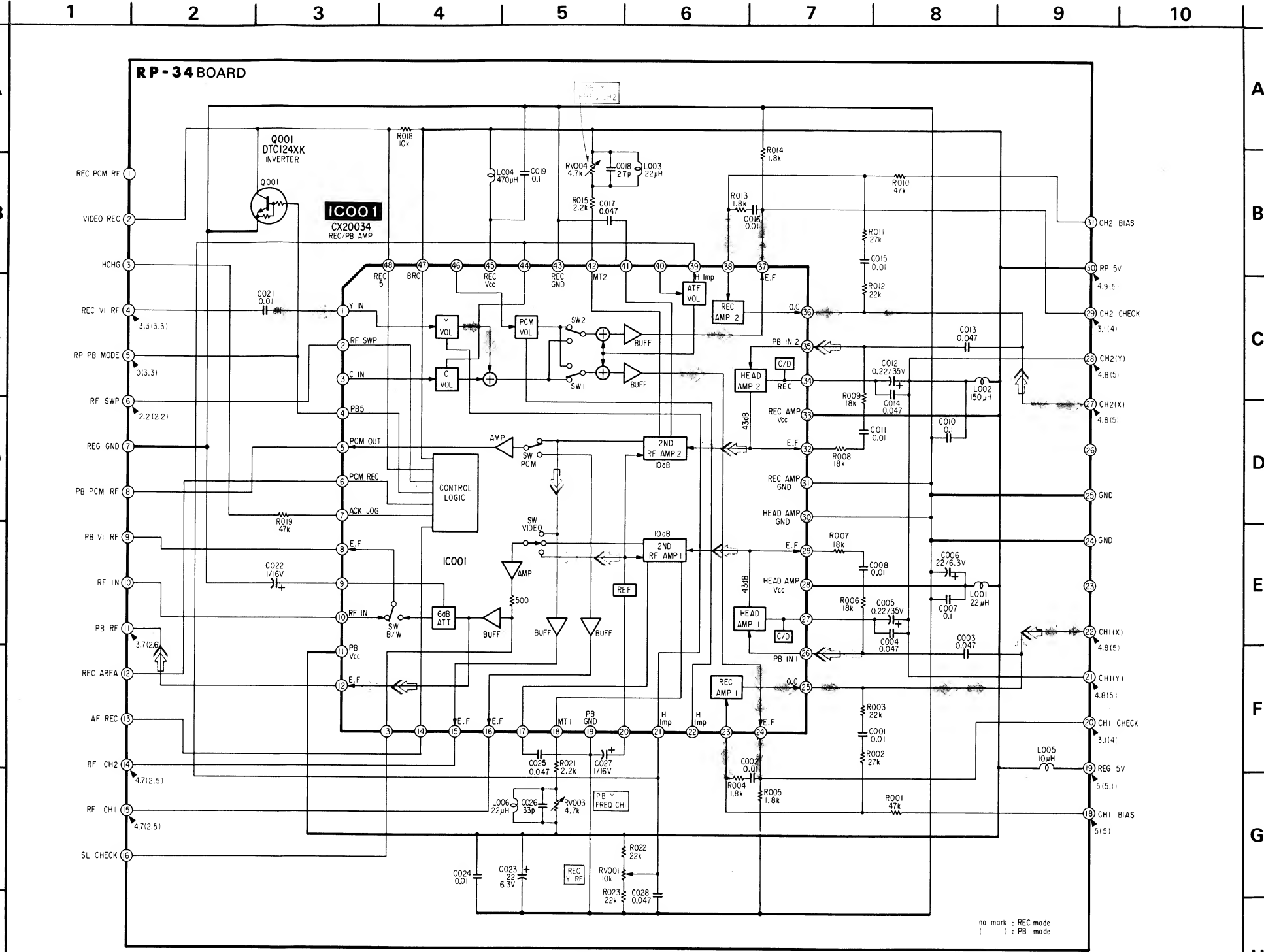


- **Signal path**

52 C Y/CHROMA Signal  
C Y/CHROMA Signal



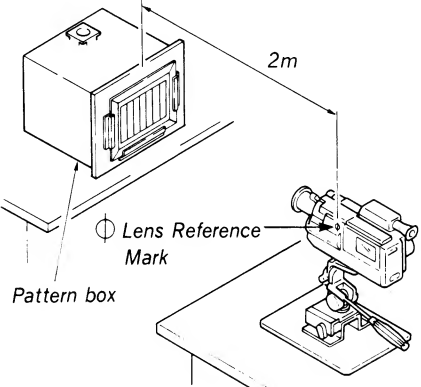
RP-34(REC/PB AMP)SCHEMATIC DIAGRAM



Note:

- Caution when replacing chip parts.  
New parts must be attached after removal of chip.  
Be careful not to heat the minus side of tantalum capacitor, because it is damaged by the head.
- All resistors are in ohms, 1/10W unless otherwise noted.
- All capacitors are in  $\mu F$  (p:pF) unless otherwise noted.  
50V or less are not indicated except for electrolytic capacitors.
- All variable and semi fixed resistors have characteristic curve B, unless otherwise noted.
- : panel designation.
- ⎓ : Nonflammable resistor
- : B+ bus.
- : adjustment for repair.
- Voltage and waveform measuring conditions:  
(1) Sample object: Pattern box colour bars.  
(2) Voltage values: Relative to ground, measured with a DC digital multimeter (impedance 10M-ohm or more).

1. Connection



2. Adjust the zooming of camera and the tripod so that the output waveform of Fig. a and the picture of Fig. b can be obtain.

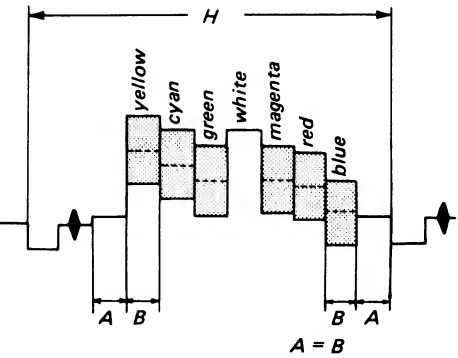


Fig.a Camera output waveform of No.⑦ terminal of FP-81 flexible board.

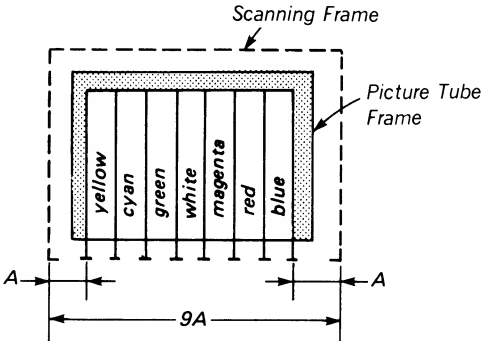
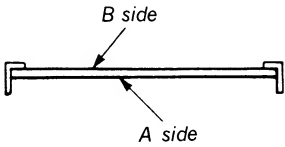


Fig. b Picture of TV monitor screen

- Note:**
- — : indicates a lead wire mounted on the component side.
  - — : indicates a lead wire mounted on the printed side.
  - ⊗ : Through hole.
  - : Pattern from the side which enables seeing.
  - : B+ pattern from the side which enables seeing.



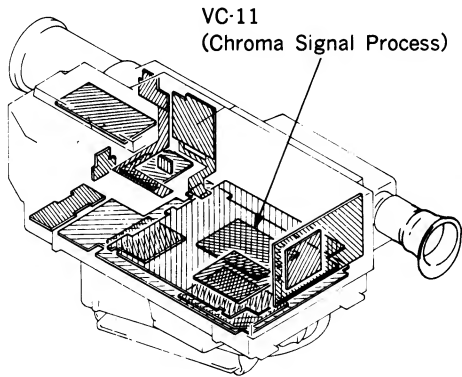
**Note**

Soldering side : Parts on the soldering side being (SIDE A) seen from the soldering are stated.

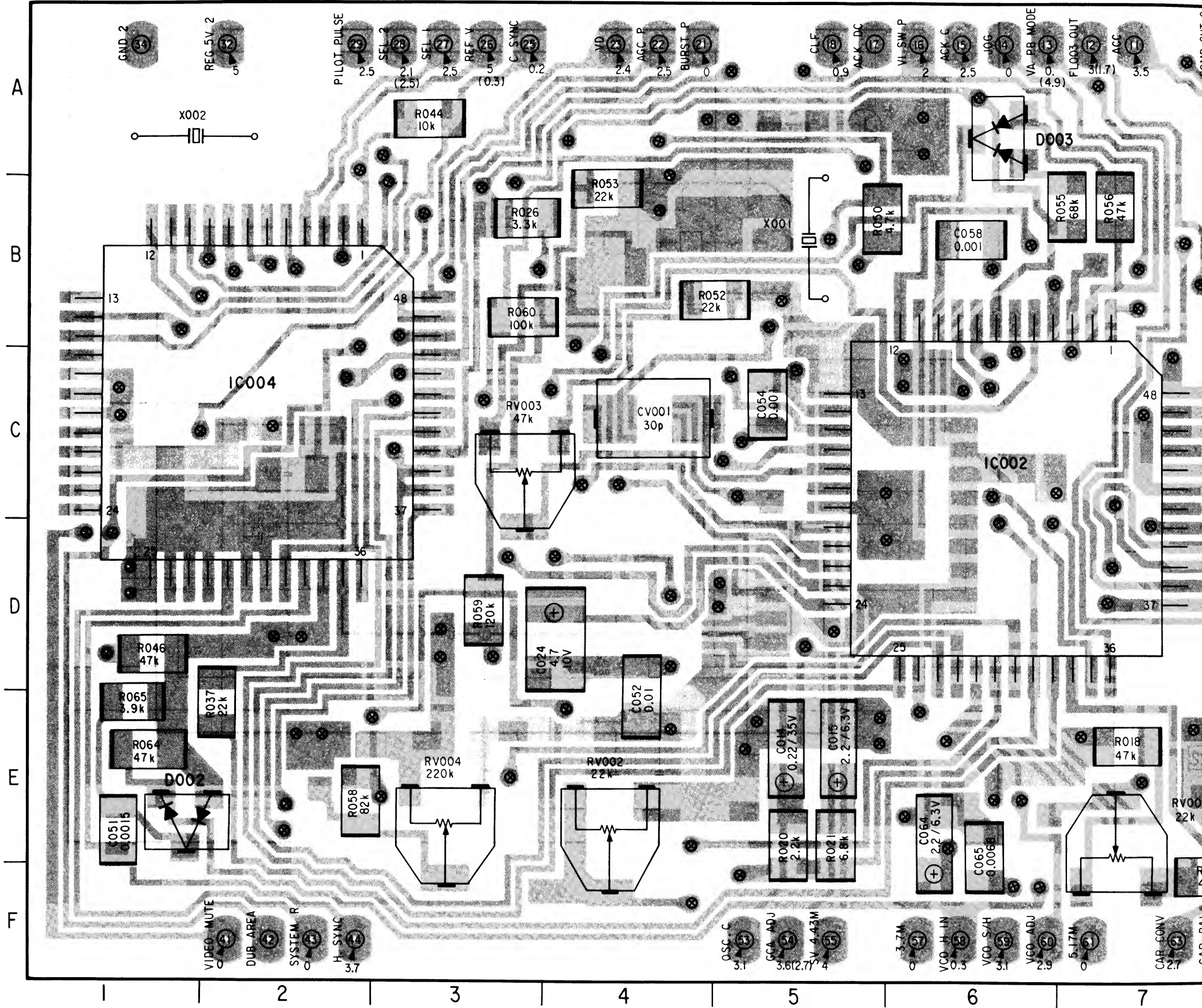
Component side : Parts on the component side being (SIDE B) seen from the component are stated.

Regarding color indication of patterns

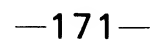
- Patterns being seen in the state from the surface side are indicated in gray pattern and red pattern (B+ pattern).
- Pattern being seen in the state of the rear surface side is indicated in green pattern.



**VC-11 BOARD (SIDE B)** no mark : REC mode  
( ) : PB mode

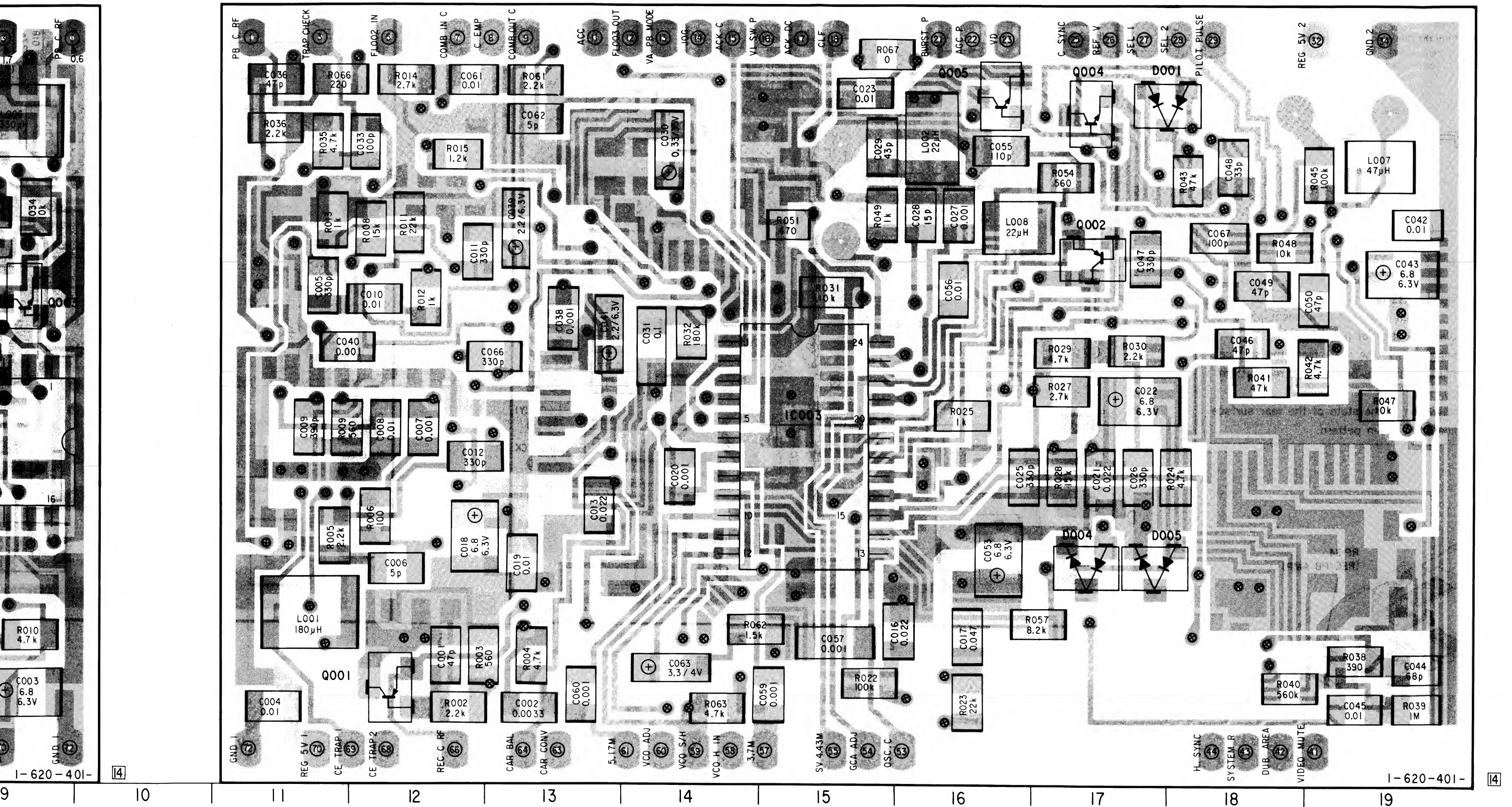








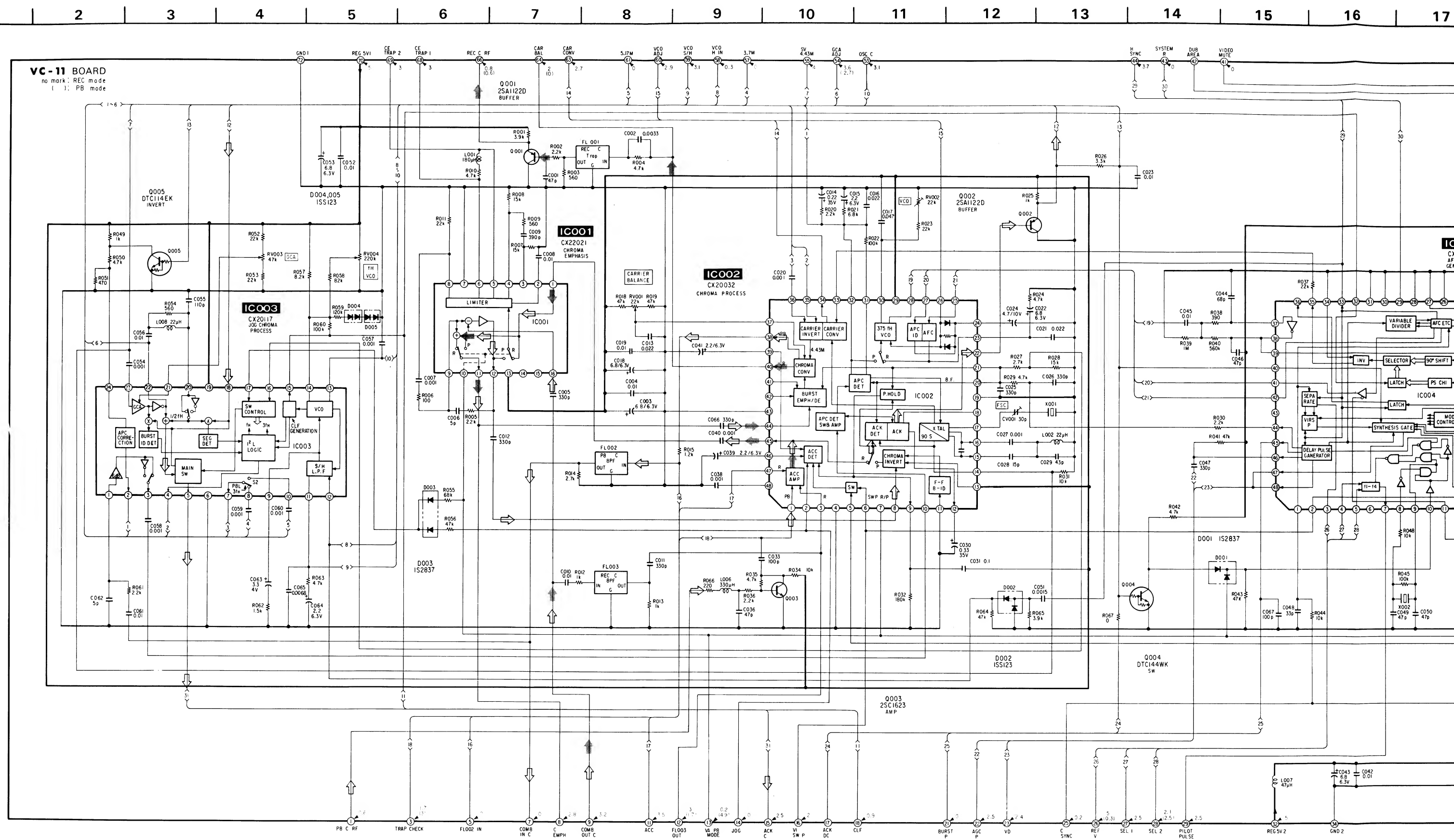
VC-11 BOARD (SIDE A)

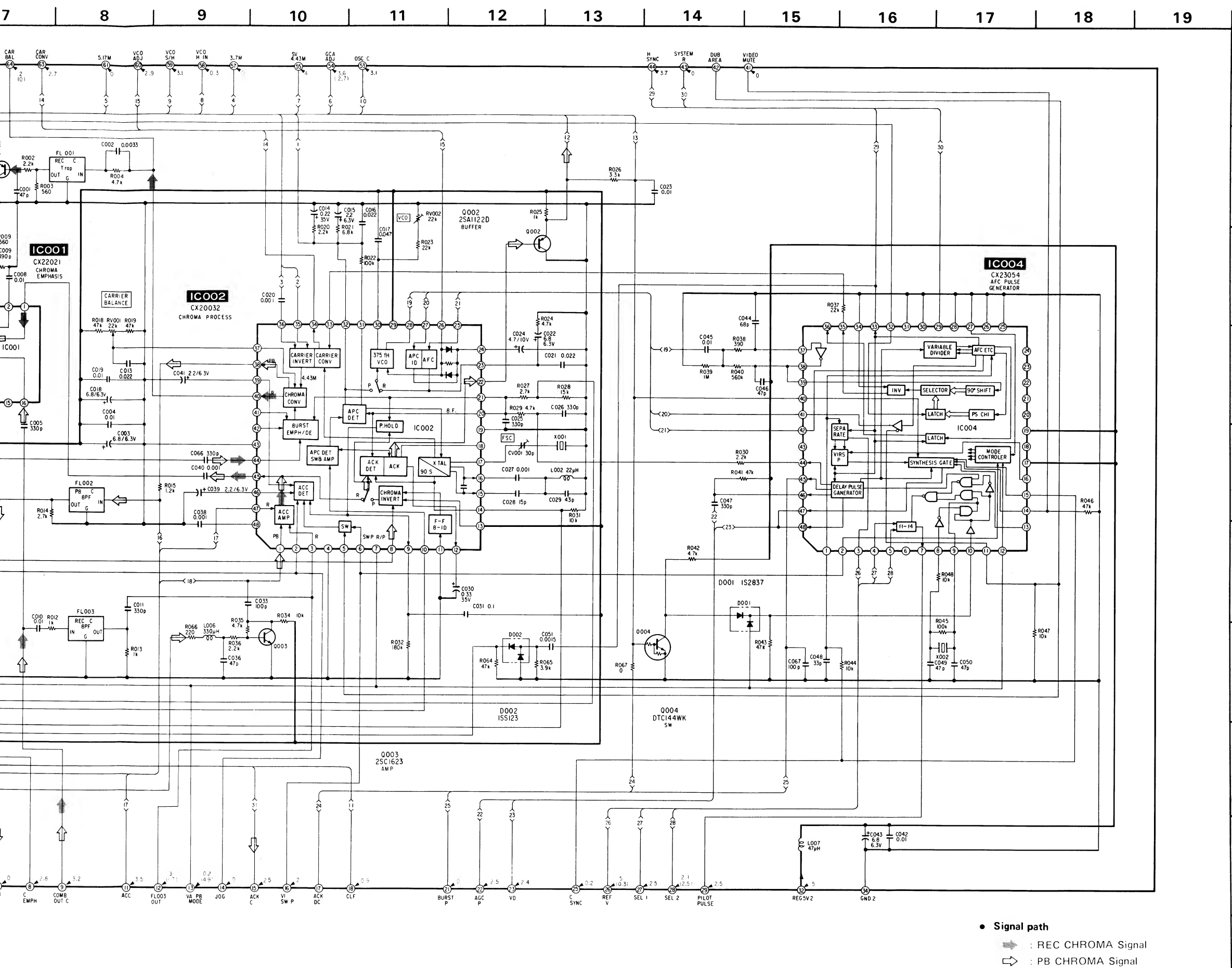




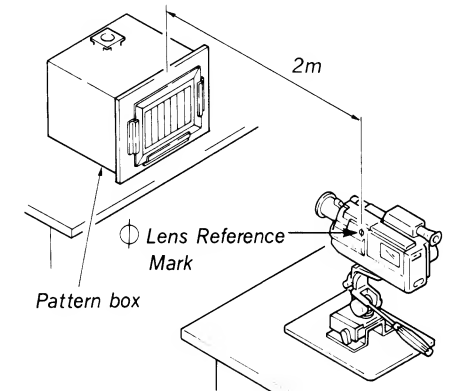
**VIDEO      VIDEO**

### VC-11(CHROMA SIGNAL PROCESS) SCHEMATIC DIAGRAM



**Note:**

- Caution when replacing chip parts.  
New parts must be attached after removal of chip.  
Be careful not to heat the minus side of tantalum capacitor, because it is damaged by the head.
- All resistors are in ohms, 1/10W unless otherwise noted.
- All capacitors are in  $\mu\text{F}$  (p:pF) unless otherwise noted.  
50V or less are not indicated except for electrolytic capacitors.
- All variable and semi fixed resistors have characteristic curve B, unless otherwise noted.
- : panel designation.
- ⎓ : Nonflammable resistor
- : B+ bus.
- : adjustment for repair.
- Voltage and waveform measuring conditions:  
(1) Sample object: Pattern box colour bars.  
(2) Voltage values: Relative to ground, measured with a DC digital multimeter (impedance 10M-ohm or more).

**1. Connection**

- 2. Adjust the zooming of camera and the tripod so that the output waveform of Fig. a and the picture of Fig. b can be obtain.**

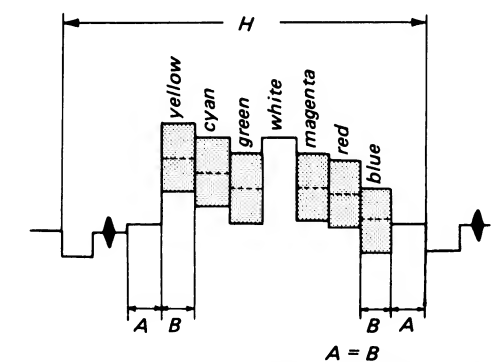


Fig.a Camera output waveform of No.⑦ terminal of FP-81 flexible board.

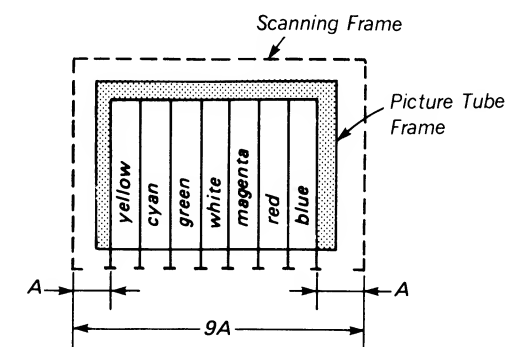
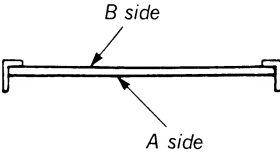


Fig. b Picture of TV monitor screen

VY-9(Y SIGNAL PROCESS) PRINTED WIRING BOARD

- Note:**
- : indicates a lead wire mounted on the component side.
  - : indicates a lead wire mounted on the printed side.
  - ⊗ : Through hole.
  - : Pattern from the side which enables seeing.
  - : B+ pattern from the side which enables seeing.



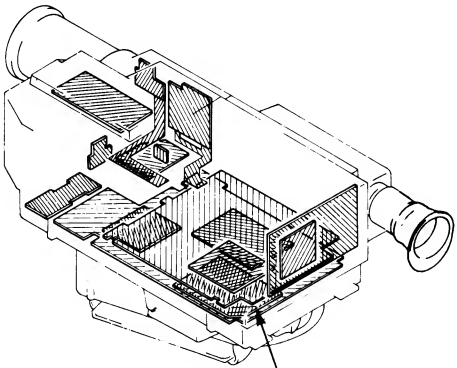
**Note**

Soldering side : Parts on the soldering side being (SIDE A) seen from the soldering are stated.

Component side : Parts on the component side being (SIDE B) seen from the component are stated.

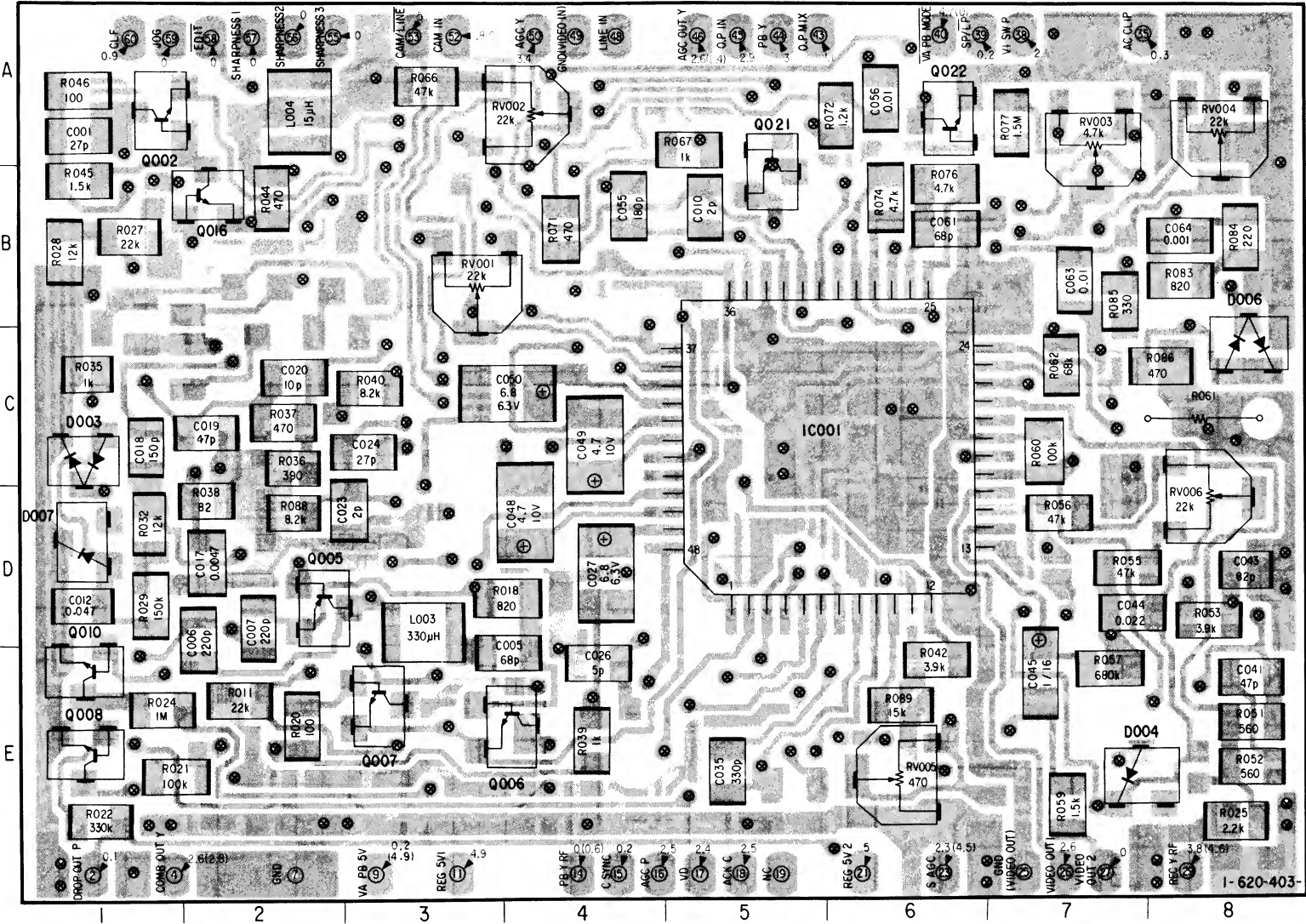
Regarding color indication of patterns

- Patterns being seen in the state from the surface side are indicated in gray pattern and red pattern (B+pattern).
- Pattern being seen in the state of the rear surface side is indicated in green pattern.

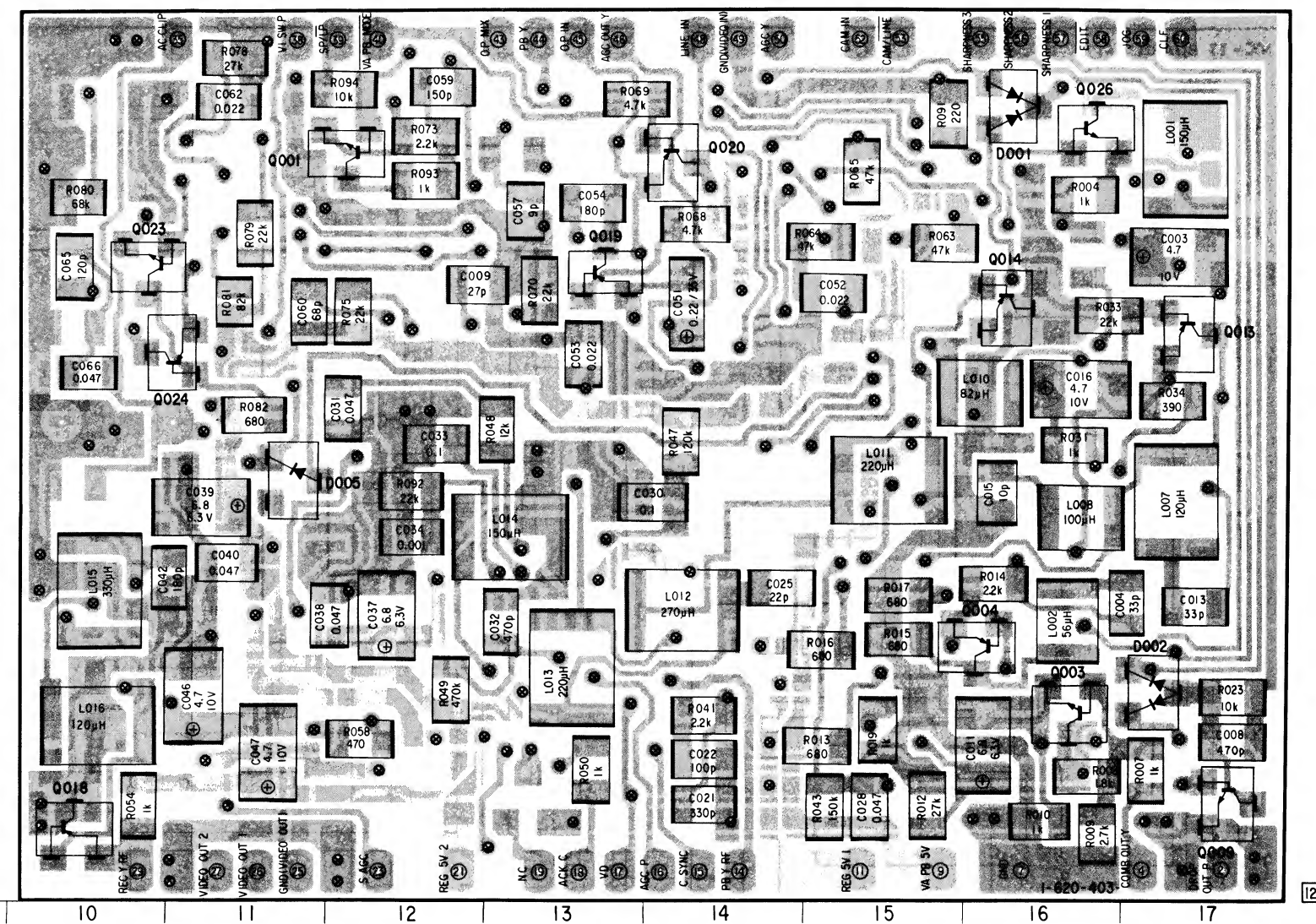


VY-9  
(Y Signal Process)

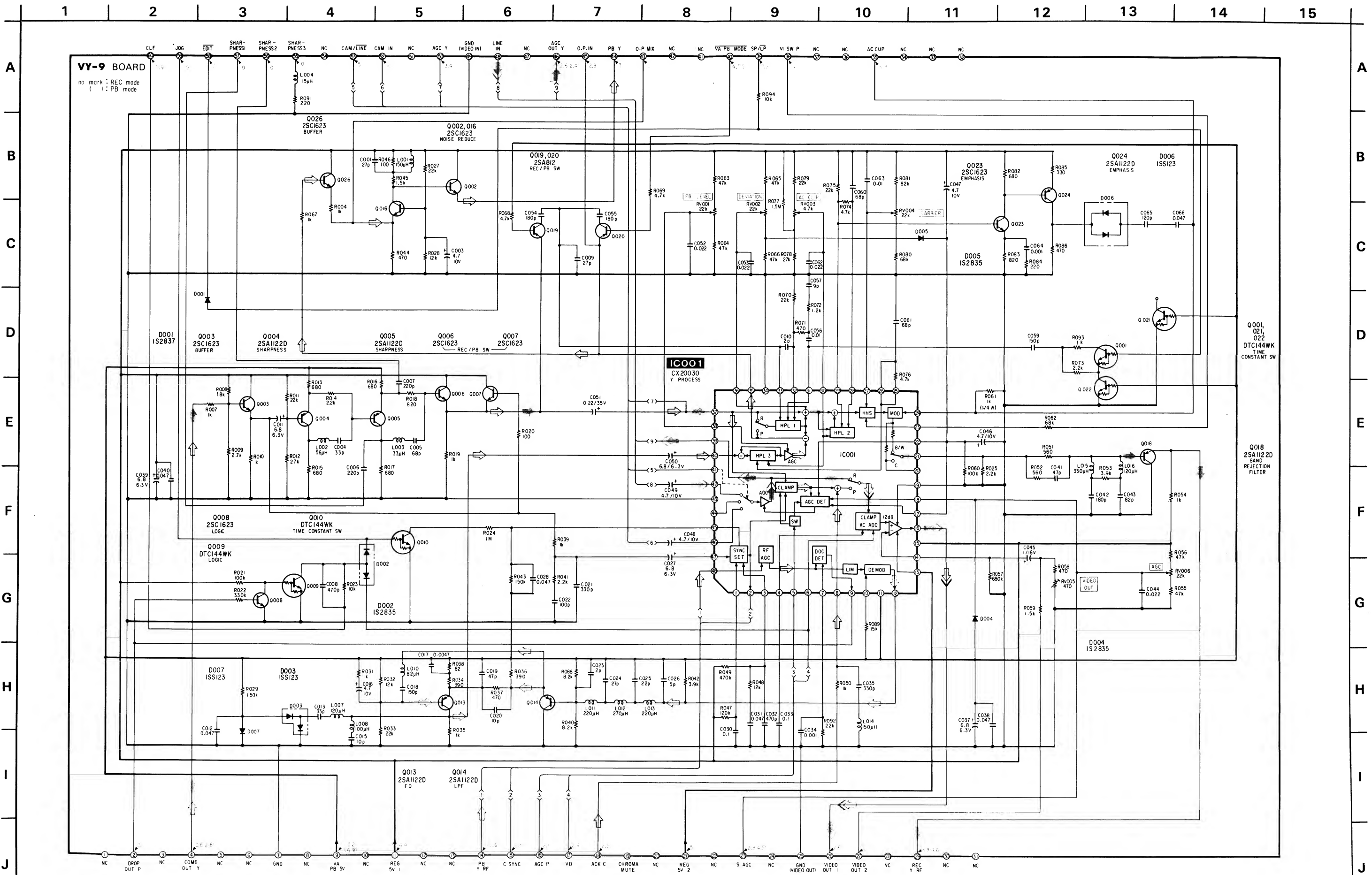
VY-9 BOARD (SIDE B) no mark : REC mode ( ) : PB mode







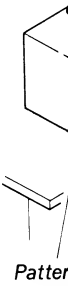
## VY-9(Y SIGNAL PROCESS) SCHEMATIC DIAGRAM



### Note:

- Caution when handling new parts must be careful not to damage the capacitor, because of its polarity.
- All resistors are 1/4W or less.
- All capacitors are 50V or less.
- All variable components are unless otherwise specified.
- : potentiometer
- : variable capacitor
- : variable inductor
- : variable resistor
- Voltage and current values are indicated in parentheses: (1) Sample value, (2) Voltage value.

### 1. Connection



### 2. Adjust the output level so that the output can be obtained.

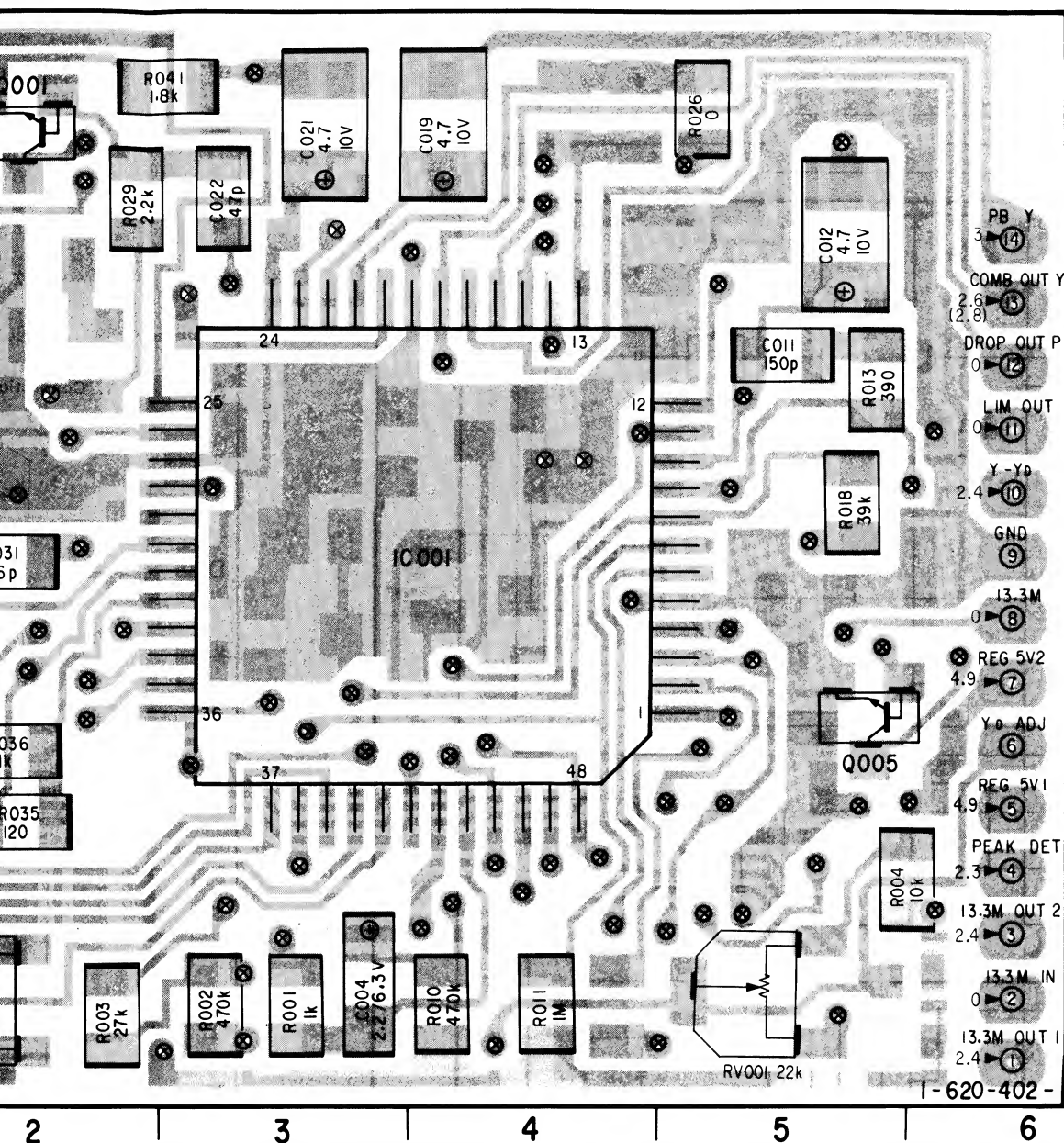


Fig.a Cam FP-8

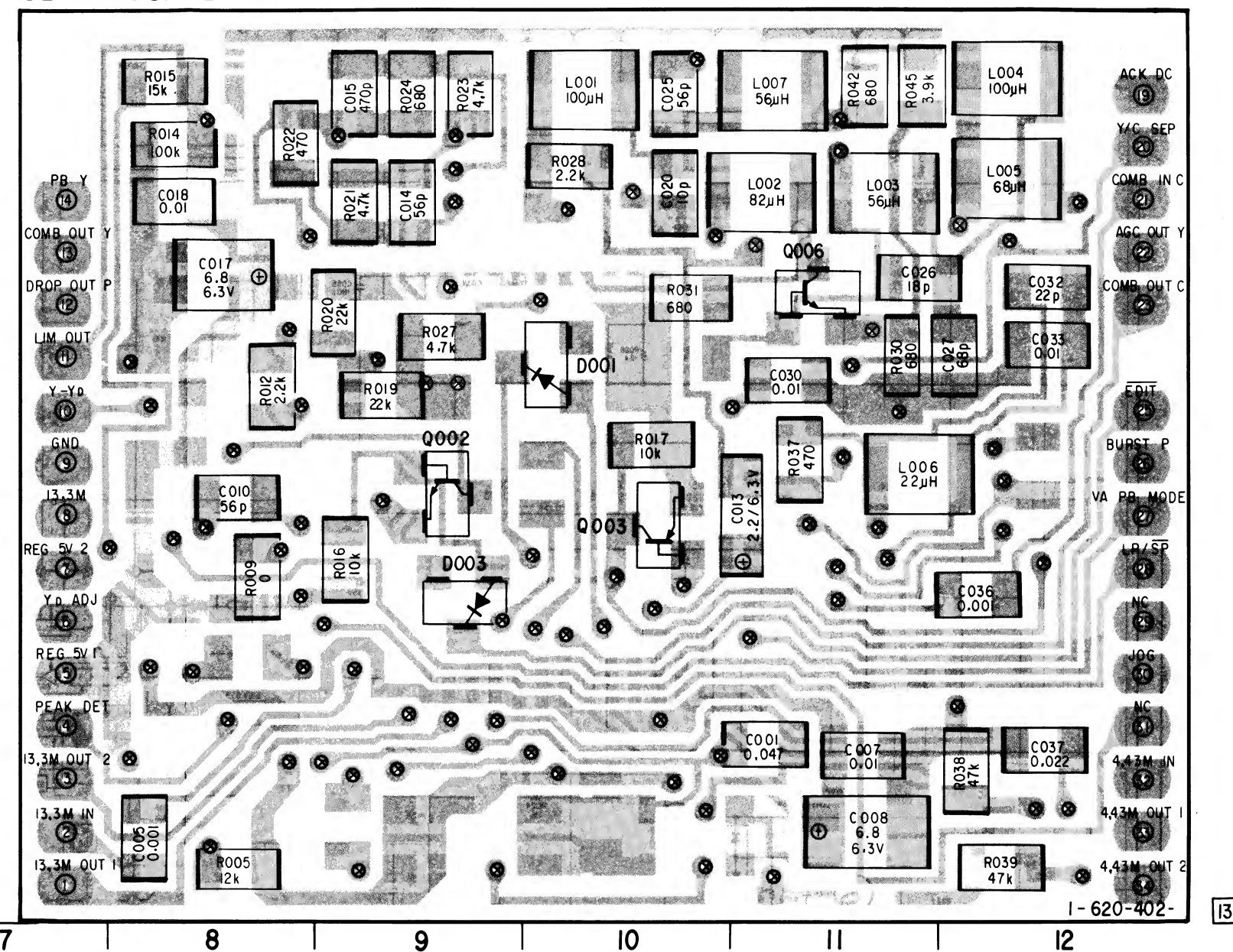




**B)** no mark : REC mode  
( ): PB mode



VD- 6 BOARD (SIDE A)

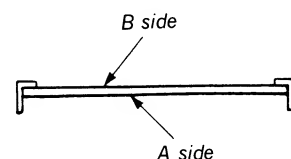




VD-6(COMB FILTER) PRINTED WIRING BOARD

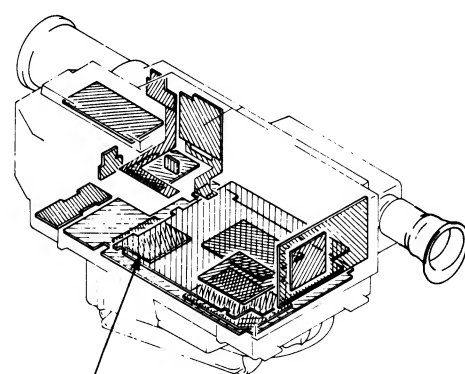
Note:

- — : indicates a lead wire mounted on the component side.
- — : indicates a lead wire mounted on the printed side.
- ⊗ : Through hole.
- : Pattern from the side which enables seeing.
- : B+ pattern from the side which enables seeing.



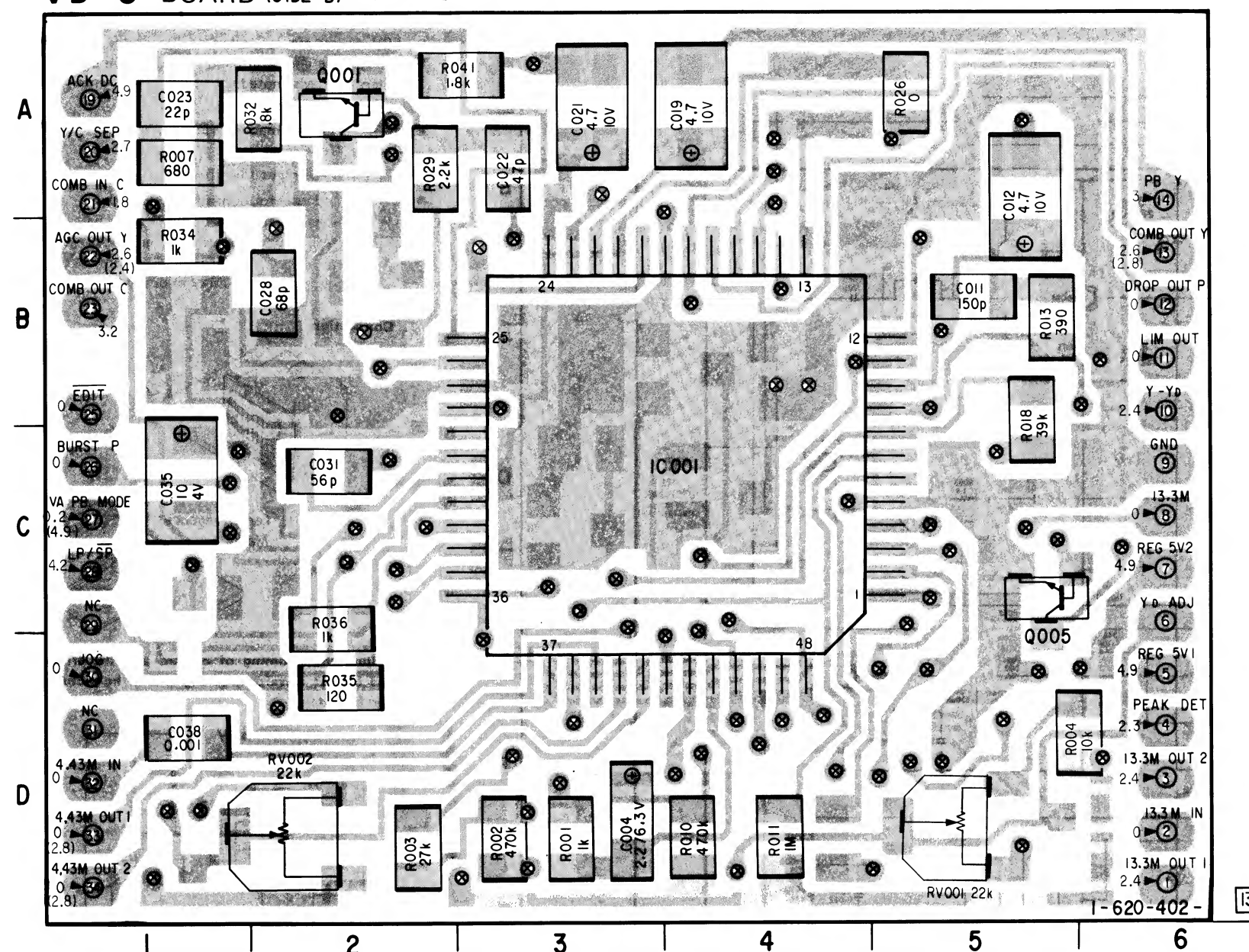
Note

- Soldering side : Parts on the soldering side being (SIDE A) seen from the soldering are stated.
- Component side : Parts on the component side being (SIDE B) seen from the component are stated.
- Regarding color indication of patterns
- Patterns being seen in the state from the surface side are indicated in gray pattern and red pattern (B+pattern).
  - Pattern being seen in the state of the rear surface side is indicated in green pattern.

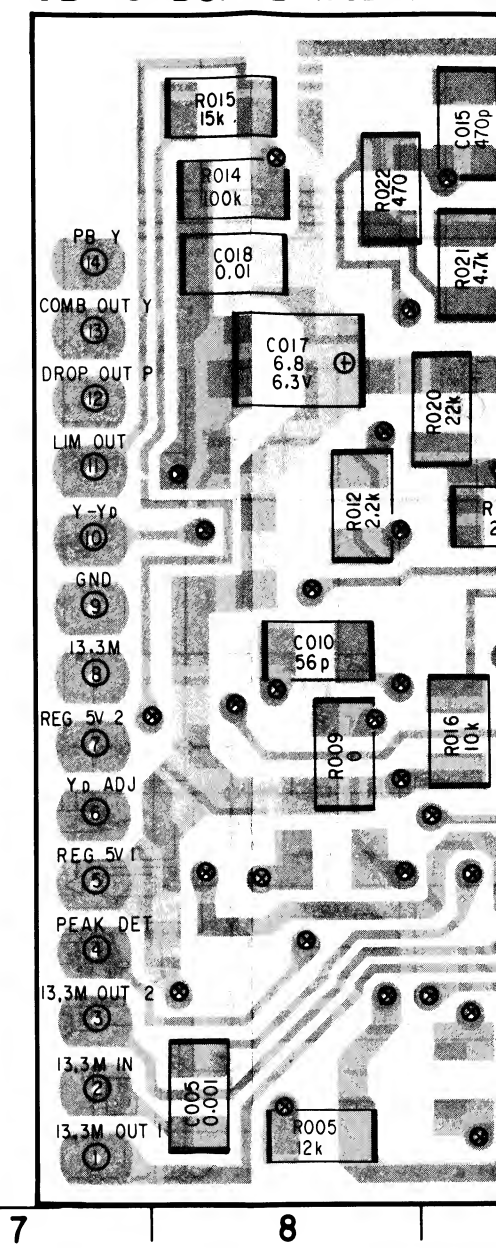


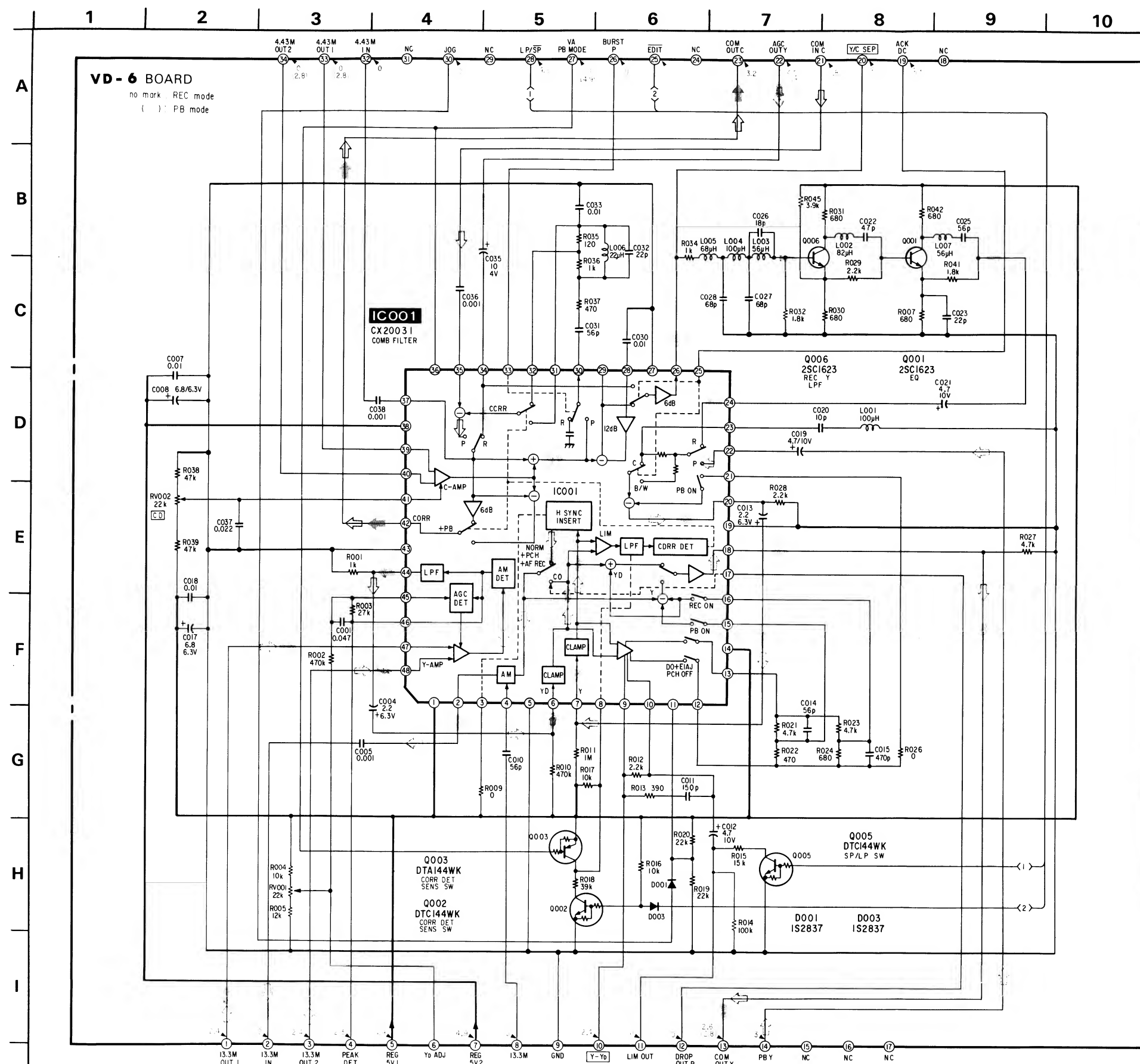
VD-6  
(Comb Filter)

VD-6 BOARD (SIDE B) ( ) : REC mode  
( ) : PB mode



VD-6 BOARD (SIDE A)



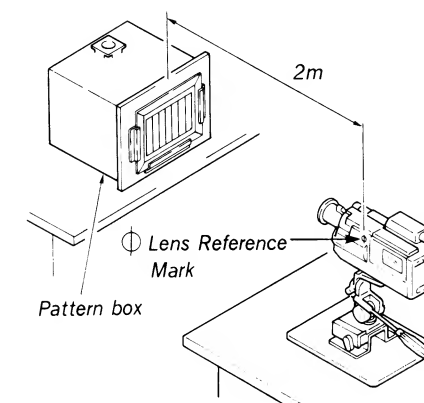


• Signal path  
REC Y Signal  
PB Y Signal  
REC CHROMA Signal  
PB CHROMA Signal  
REC Y-CHROMA Signal

Note:

- Caution when replacing chip parts. New parts must be attached after removal of chip. Be careful not to heat the minus side of tantalum capacitor, because it is damaged by the head.
- All resistors are in ohms, 1/10W unless otherwise noted.
- All capacitors are in  $\mu\text{F}$  (p:pF) unless otherwise noted. 50V or less are not indicated except for electrolytic capacitors.
- All variable and semi fixed resistors have characteristic curve B, unless otherwise noted.
- $\square$  : panel designation.
- $\square$  : Nonflammable resistor
- $\square$  : B+ bus.
- $\square$  : adjustment for repair.
- Voltage and waveform measuring conditions:  
(1) Sample object: Pattern box colour bars.  
(2) Voltage values: Relative to ground, measured with a DC digital multimeter (impedance 10M-ohm or more)

1. Connection



2. Adjust the zooming of camera and the tripod so that the output waveform of Fig. a and the picture of Fig. b can be obtain.

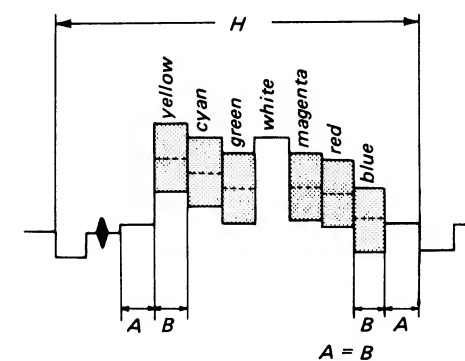


Fig. a Camera output waveform of No. 7 terminal of FP-81 flexible board.

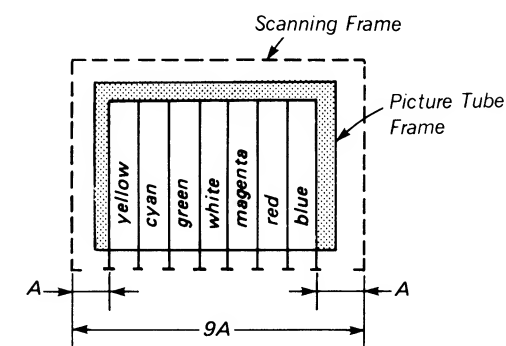
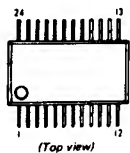


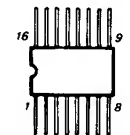
Fig. b Picture of TV monitor screen

4-3. SEMICONDUCTORS

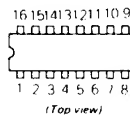
AN2510S



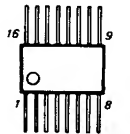
BA6303F  
CX20115  
CX22021  
MC14526BF  
TA7733F  
TC4526BF  
TC4538BF



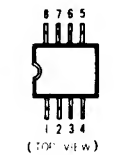
CXA1042M



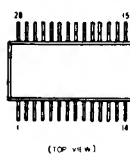
CXA1157M  
TL1451ACNS  
 $\mu$ PD6142G-101



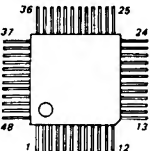
CXB0026M  
TL062CPS  
 $\mu$ PC393G2



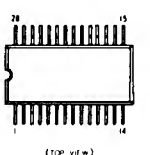
CXD1030M



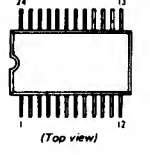
CX20030  
CX20031  
CX20032  
CX20034  
CX20037-A  
CX20053  
CX20054  
CX20055  
CX20151  
CX23054  
CX23047B  
MB673194U



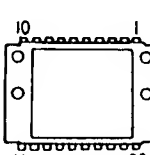
CX20035  
CX20036  
CX20039



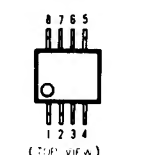
CX20114  
CX20117  
CX20180



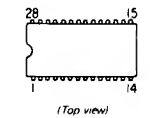
IU021K  
IU021CK



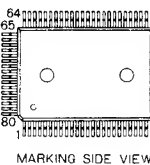
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 $\mu$ PD4066BG



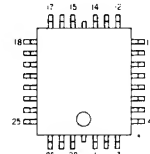
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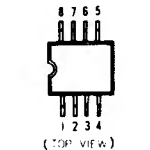
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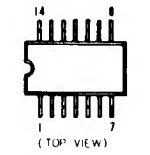
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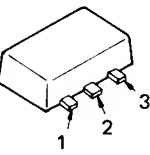
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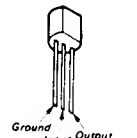


S-8052AL0-LG  
S-8054ALB



1. OUT  
2. IN  
3. GND

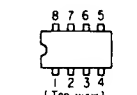
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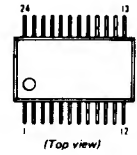
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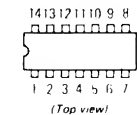
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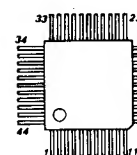
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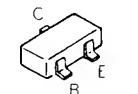
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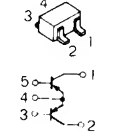
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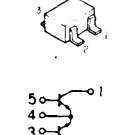
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DTA144EK  
DTA144TK  
DTA144WK  
DTC114EK  
DTC124EK  
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DTC144EK  
DTC144TK  
DTC144WK  
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2SA1037  
2SA1122  
2SA1162  
2SA1179  
2SA1226  
2SB624  
2SB624-BV4  
2SB815-B6  
2SC1623  
2SC1623-L7  
2SC2223  
2SC2412K  
2SC2712  
2SC2757  
2SC2812L5  
2SC3052  
2SC3053-C



FMA2  
FMS1



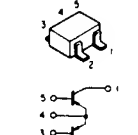
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FMW2



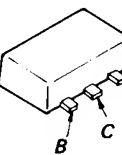
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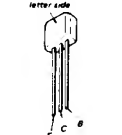
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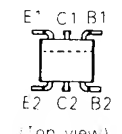
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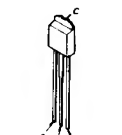
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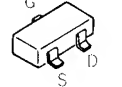
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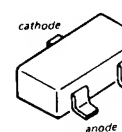
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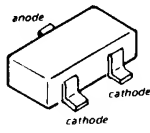
2SK160-K6  
2SK303-TB  
2SK209  
2SK94



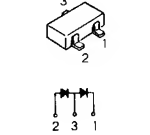
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MA151WK



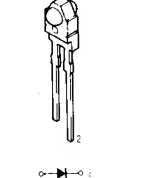
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MA152WA  
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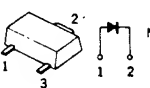
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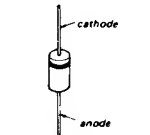
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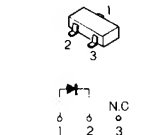
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E10QS03  
E10QS04



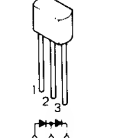
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HZ5BLL  
RD13EB2



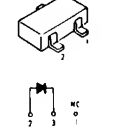
MA151WA  
1SS187  
1SS222



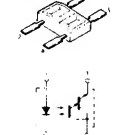
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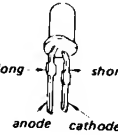
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RD9.1M-B1  
1SS193  
1SS220



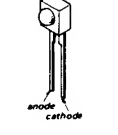
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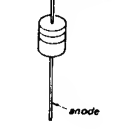
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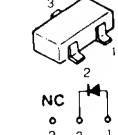
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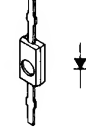
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1SS133  
1SS148



1SS196



1T32



## SECTION 5 EXPLODED VIEWS

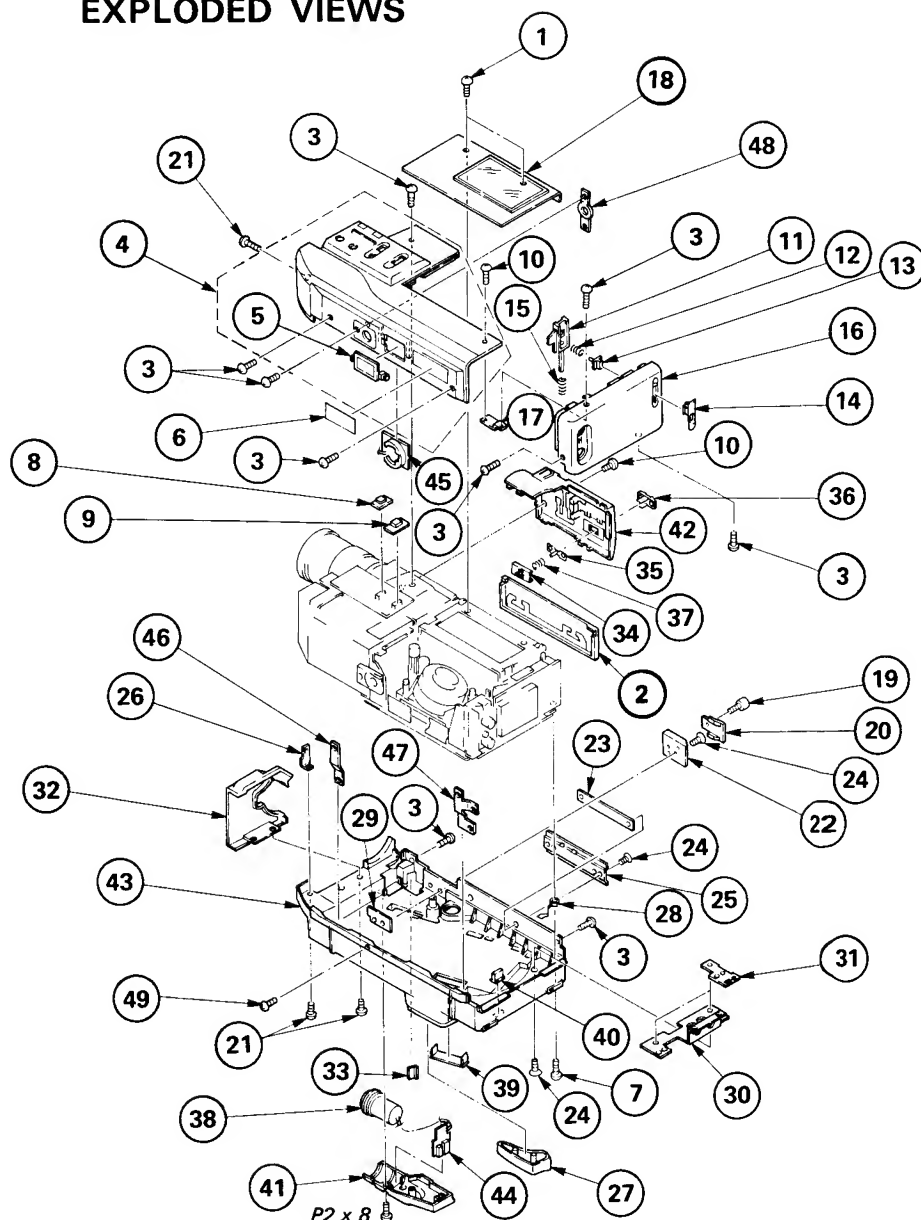
### NOTE:

ated when ordering these items.

- The mechanical parts with no reference number in the exploded views are not supplied.
- The construction parts of an assembled part are indicated with a collation number in the remark column.
- Items marked "\*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

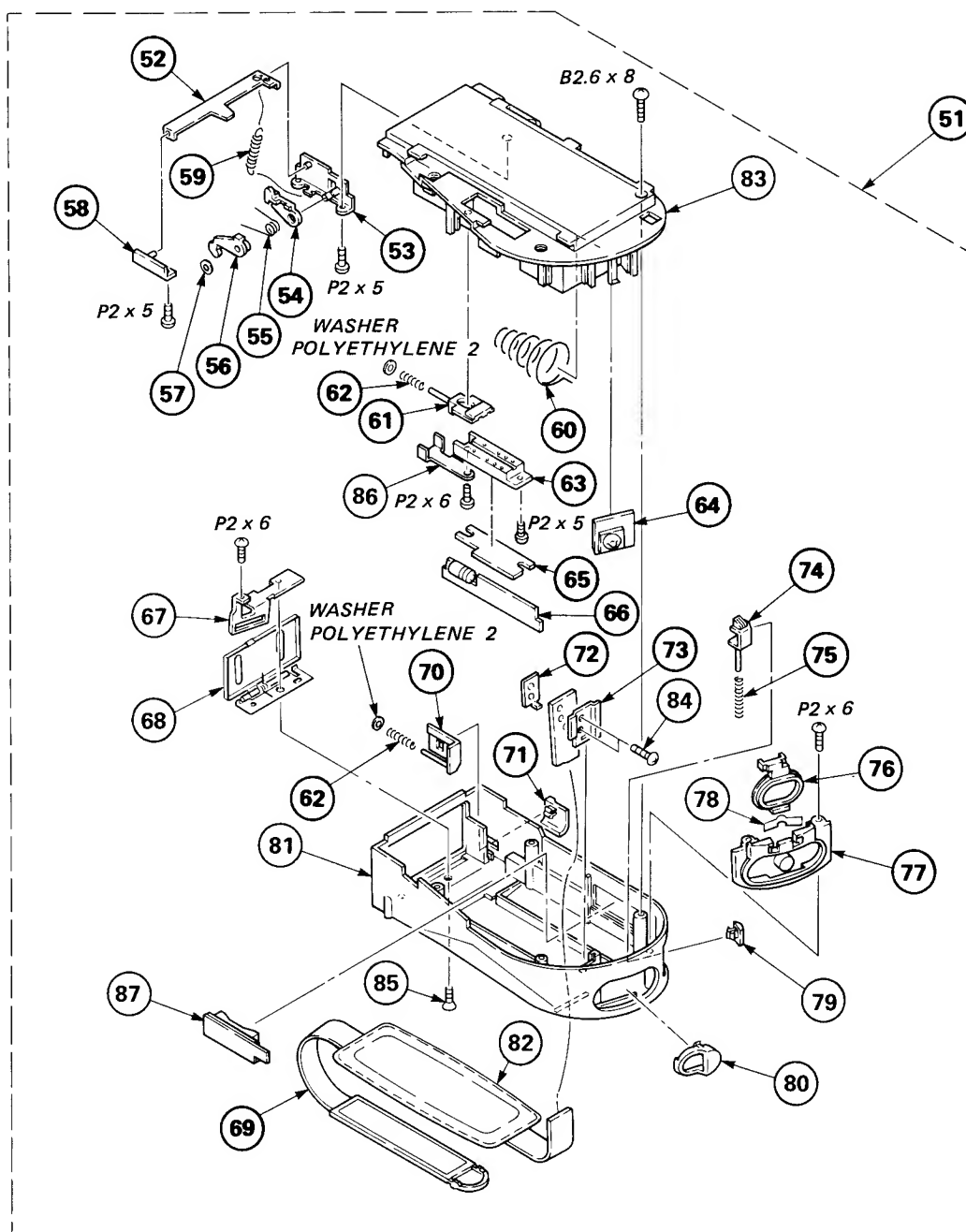
The components identified by shading and mark **A** are critical for safety. Replace only with part number specified.

### 5-1. CABINET ASSEMBLY



No.	Part No.	Description	Remark	No.	Part No.	Description	Remark
1	3-713-791-01	SCREW (M1.7X5), TAPPING, P2		25	3-713-782-01	RAIL, GUIDE	
2	X-3712-046-1	LID ASSY, LS CASSETTE		26	*3-719-355-01	JOINT, CABINET (LEFT) (RIGHT)	
3	3-713-912-01	SCREW (M2X10)		27	3-719-361-01	HAND REST	
4	X-3713-705-1	CABINET (R) ASSY	5	28	*3-713-965-01	PLATE (C), GROUND	
5	3-719-364-01	LID, BATTERY CASE, LITHIUM		29	3-713-715-01	BRACKET, SHOE	
6	*3-719-384-01	LABEL, MODEL NUMBER (UK/E/SWITZERLAND MODEL)		30	3-713-774-01	JOINT, REAR	
	*3-719-385-01	LABEL, MODEL NUMBER (AEP) (AEP MODEL)		31	3-713-713-01	BRACKET, STRAP	
7	3-713-786-01	SCREW (M2X4)		32	X-3712-169-1	PANEL ASSY, FRONT	
8	3-712-188-01	KNOB, AF		33	3-719-352-01	WINDOW, AW SENSOR	
9	3-712-187-01	KNOB, AWB		34	3-719-360-01	PLATE, LOCK	
10	3-713-786-31	SCREW (M2X6)		35	3-719-359-01	BUTTON, LOCK	
11	3-713-747-01	KNOB (B), EJECT		36	3-718-226-01	BUTTON, POWER	
12	3-699-532-02	SPRING, COMPRESSION		37	3-303-973-00	SPRING, TENSION	
13	3-699-534-01	KNOB, LOCK		38	1-542-091-21	MICROPHONE, ELECTRET CONDENSER	
14	3-699-537-01	KNOB, EJECT		39	1-559-324-21	SOCKET (TERMINAL BOARD (B))	
15	3-713-905-01	SPRING, COMPRESSION		40	3-713-714-01	KNOB, EDIT	
16	X-3713-704-1	PANEL ASSY, REAR		41	3-719-371-11	HOUSING, MICROPHONE	
17	3-712-193-01	JOINT, CABINET		42	X-3713-703-1	BOARD ASSY, FUNCTION	
18	X-3713-732-1	LID ASSY, CASSETTE		43	*A-7080-377-A	CABINET (LEFT) BLOCK ASSY 19-31, 46, 47	
19	3-678-103-11	SCREW, EVF STOPPER		44	*A-7070-500-A	MJ-12 BOARD, COMPLETE	
20	3-688-940-01	SPRING, LEAF		45	*A-7070-499-A	LI-3 BOARD, COMPLETE	
21	3-713-786-21	SCREW (M2X3)		46	*3-719-356-01	JOINT, LR	
22	3-688-985-01	SHOE, ACCESSORY		47	*3-719-357-01	JOINT, LRR	
23	3-713-914-01	BRACKET, EVF SHOE		48	3-719-353-01	SCREW, TRIPOD	
24	3-713-788-01	SCREW (M2X5)		49	3-719-381-01	SCREW (M2X4)	

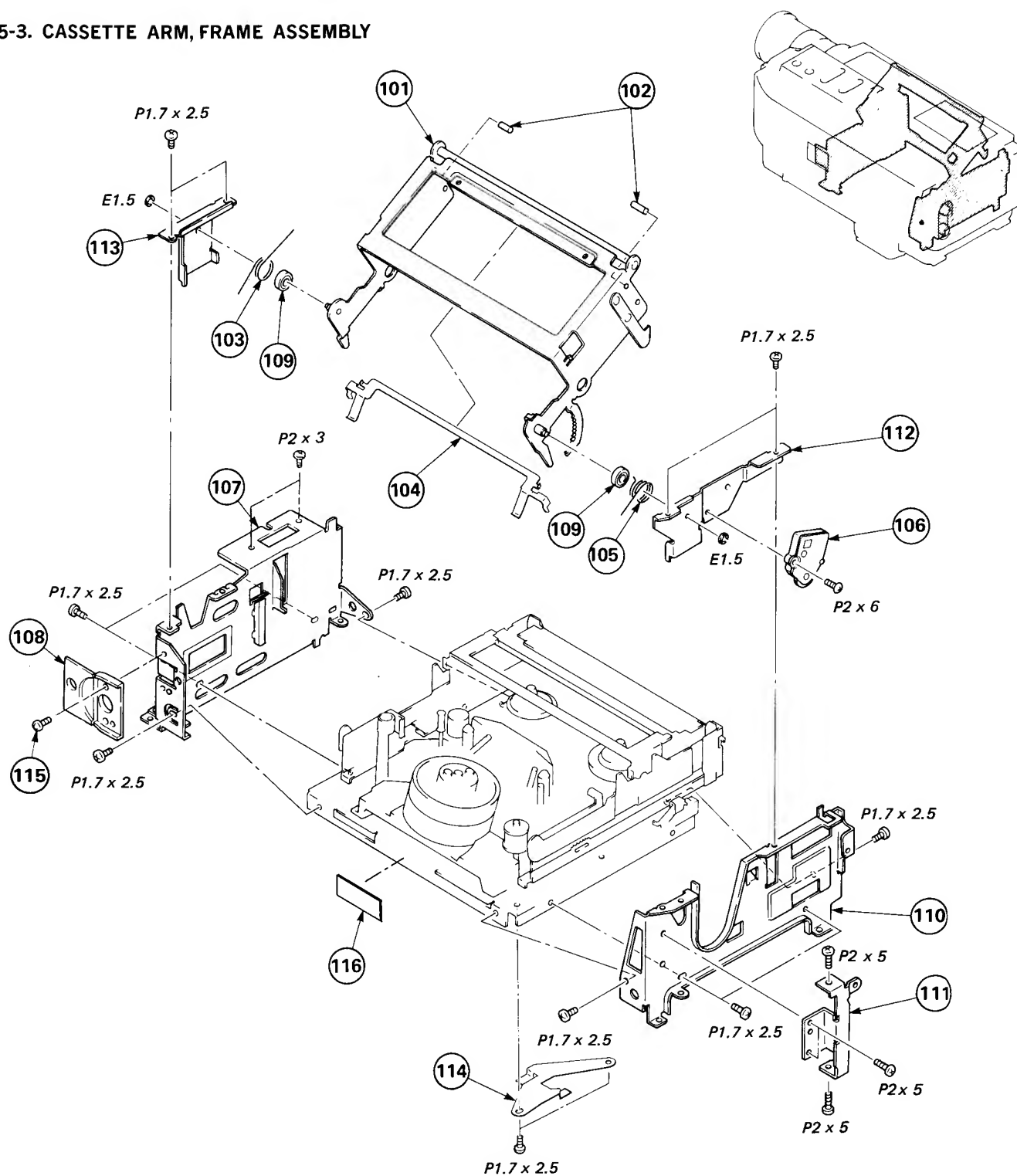
## 5-2. GRIP ASSEMBLY



No.	Part No.	Description	Remark	No.	Part No.	Description	Remark
51	A-7080-379-A	GRIP BLOCK ASSY	52-87	70	3-713-703-01	CLAW, B RELEASE	
52	3-712-198-01	PLATE, LOCK, B		71	3-713-749-01	KNOB, B RELEASE	
53	X-3712-055-1	SUPPORT (UPPER) ASSY, B LOCK		72	3-713-711-01	BRACKET (C), BELT	
54	3-713-750-01	RETAINER, LOCK PLATE		73	3-713-710-01	BRACKET (A), BELT	
55	3-713-704-01	SPRING, TORSION		74	3-713-707-01	LEVER, RELEASE, G	
56	3-713-751-01	LEVER, RELEASE, B		75	3-465-047-00	SPRING, COMPRESSION	
57	3-321-813-11	WASHER, COTTER POLYETHYLENE		76	3-713-753-01	HOLDER, PS KEY TOP	
58	X-3712-056-1	SUPPORT (LOWER) ASSY, B LOCK		77	X-3712-045-1	HOLDER ASSY, REC BUTTON	
59	3-305-914-00	SPRING, TENSION		78	3-713-709-01	SPRING	
60	3-713-935-01	SPRING		79	3-713-706-01	KNOB, G RELEASE	
61	3-713-708-01	COVER, TERMINAL		80	3-713-723-01	KEY TOP, PS	
62	3-564-951-00	SPRING, COMPRESSION		81	X-3713-702-1	CABINET (L) ASSY, GRIP	
63	1-566-607-11	PLUG (TERMINAL BOARD (A))		82	3-712-061-01	PAD, GRIP	
64	*A-7070-502-A	RC-21 BOARD, COMPLETE		83	X-3712-164-1	CABINET (R) ASSY, GRIP	
65	*1-623-014-11	TA-50 BOARD		84	3-712-069-01	SCREW (M2X5)	
66	*1-623-018-11	FH-14 BOARD		85	3-713-787-01	SCREW (M2X4)	
67	3-712-516-01	BRACKET (B), BELT		86	*3-713-938-01	RETAINER, TERMINAL COVER	
68	X-3712-010-1	LID ASSY, BATTERY		87	1-554-944-41	SWITCH, PUSH (ZOOM)	
69	3-713-796-01	BELT, GRIP					

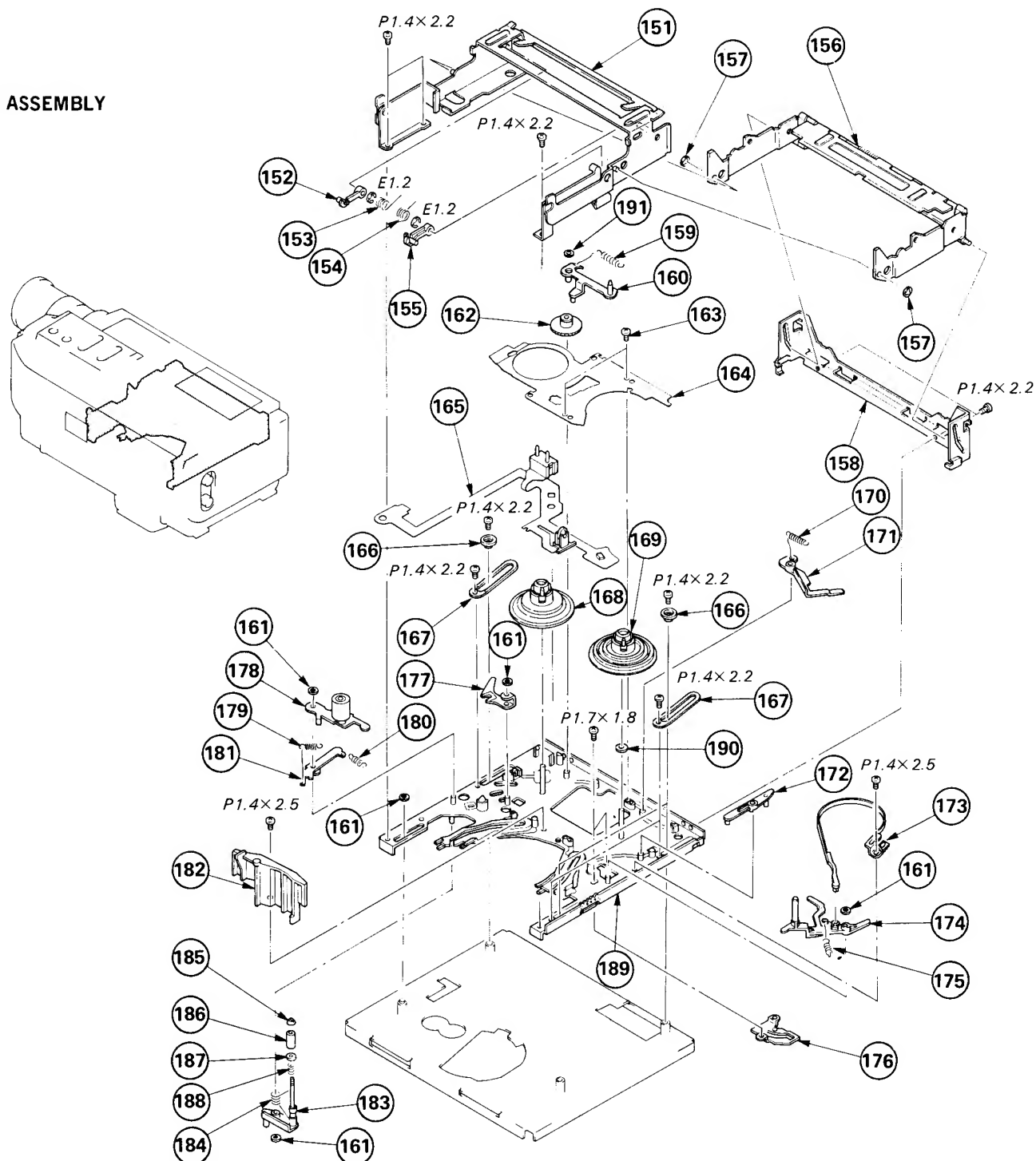


### 5-3. CASSETTE ARM, FRAME ASSEMBLY



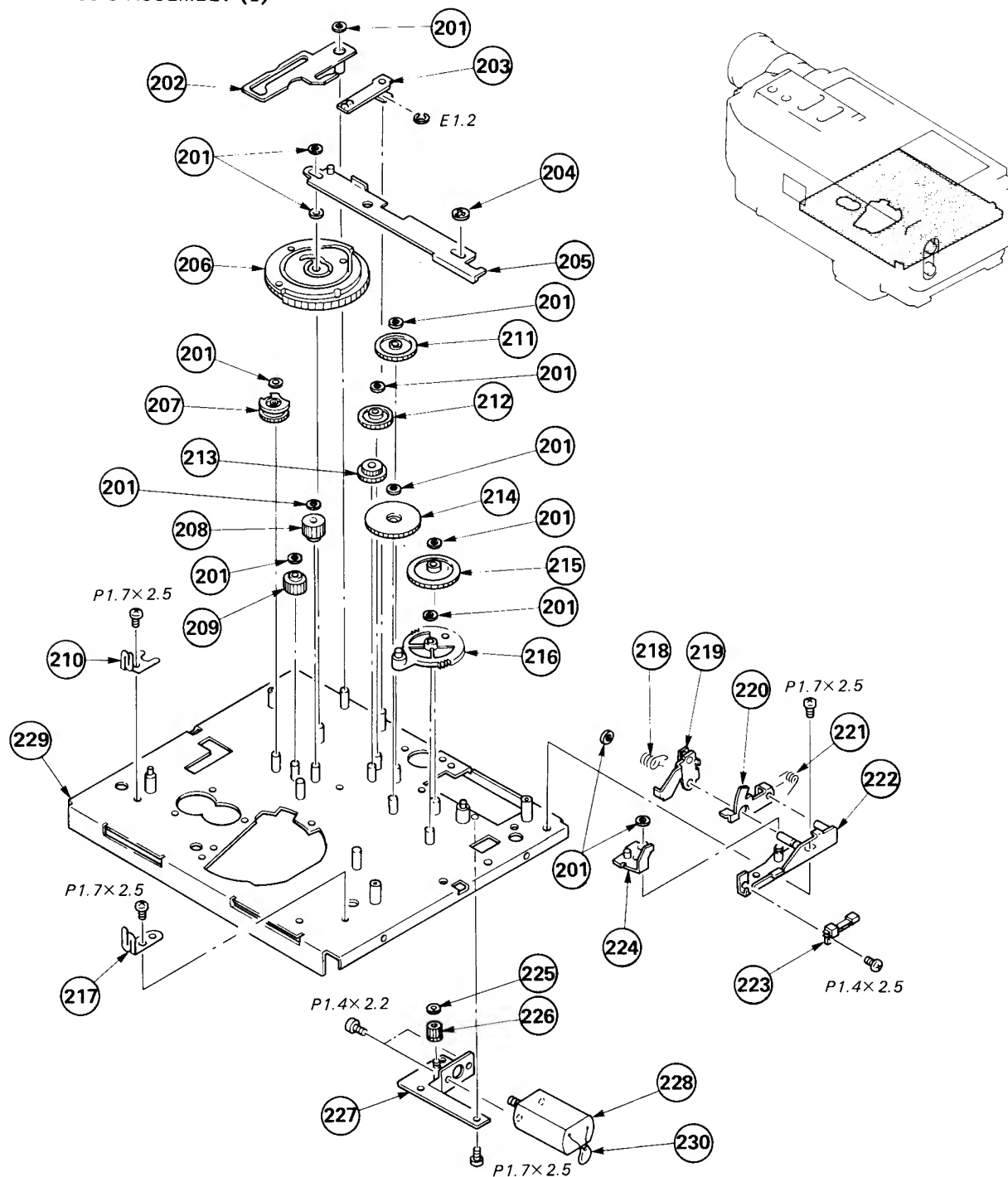
No.	Part No.	Description	Remark	No.	Part No.	Description	Remark
101	X-3712-034-1	ARM ASSY (2), CASSETTE	102, 104	109	3-695-512-02	COLLAR, CASSETTE ARM	
102	3-695-602-01	SHAFT, RIVETING, CASSETTE ARM		110	*X-3712-026-2	FRAME (B) ASSY (2)	
103	3-695-582-01	SPRING, TORSION		111	*3-712-197-01	BRACKET, JACK	
104	3-695-580-01	RETAINER, CASSETTE COMPARTMENT		112	3-695-641-01	PLATE (S2), SIDE	
105	3-695-581-01	SPRING, TORSION		113	3-695-603-01	PLATE (T2), SIDE	
106	3-681-528-11	DAMPER		114	3-716-455-01	CLAMP, DH	
107	*X-3712-167-1	FRAME ASSY (3)		115	3-713-786-01	SCREW (M2X4)	
108	3-719-358-01	COVER, TRIPOD SCREW		116	3-831-441-XX	CUSHION	

## 5-4. LS ASSEMBLY



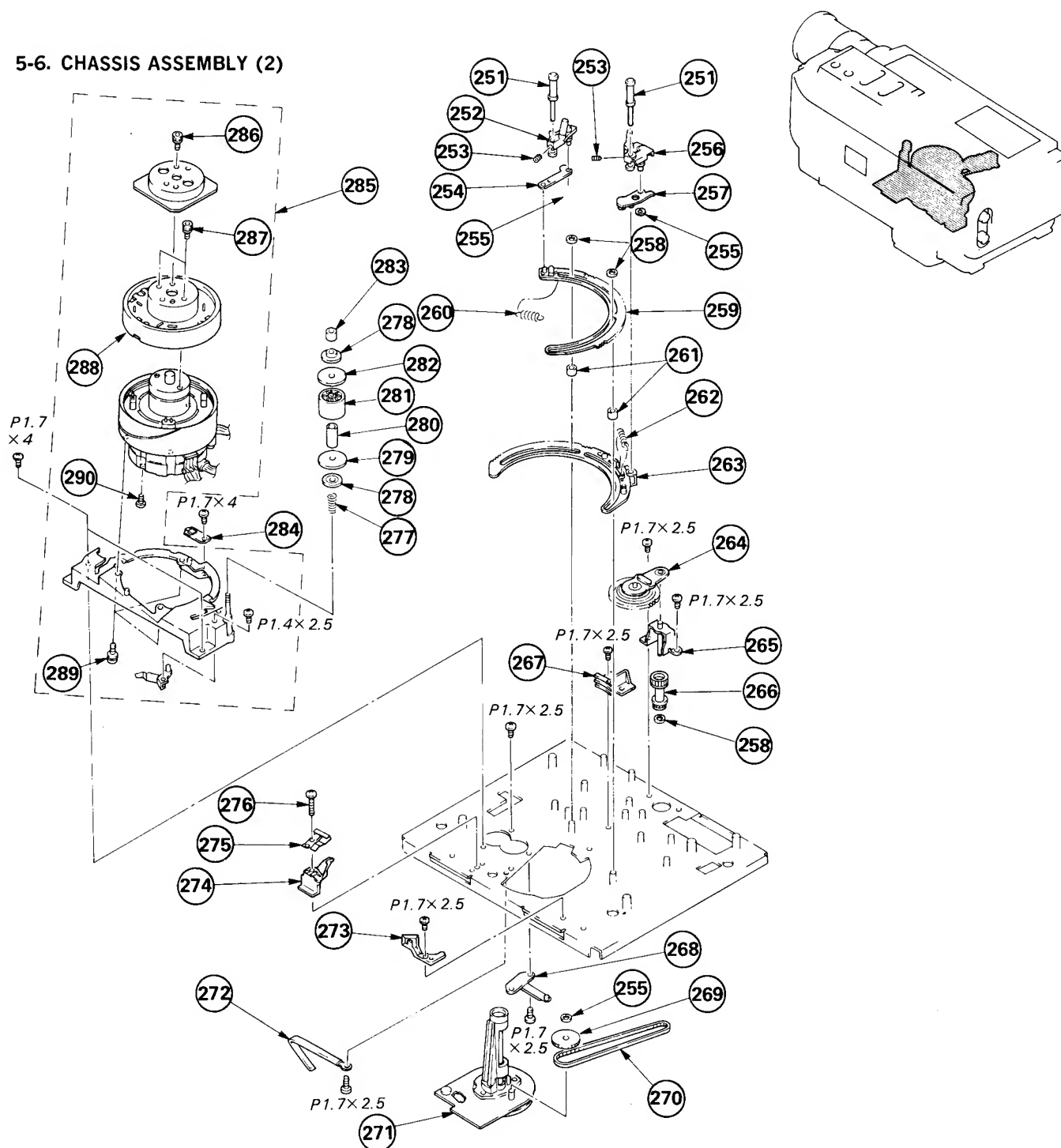
No.	Part No.	Description	Remark	No.	Part No.	Description	Remark
151	X-3695-447-4	COMPARTMENT ASSY, CASSETTE, LS		172	3-695-735-01	ARM, TG1 RELEASE	
152	3-695-595-01	RETAINER (T), CASSETTE		173	X-3695-432-1	BAND ASSY, TG1	
153	3-695-605-01	SPRING, TORSION		174	X-3712-019-1	ARM ASSY (2), TG1	
154	3-695-604-01	SPRING, TORSION		175	3-695-591-01	SPRING, TENSION	
155	3-695-594-01	RETAINER (S), CASSETTE		176	3-695-733-01	PLATE, CAM, LS	
156	X-3695-448-3	ARM ASSY, BLIND		177	X-3712-022-1	ARM (B) ASSY (2), PINCH	
157	3-669-465-00	WASHER (1.5), STOPPER		178	X-3712-032-2	ARM (C) ASSY (2), PINCH	
158	3-695-646-01	ARM, LS		179	3-695-622-01	SPRING, TENSION	
159	3-695-718-01	SPRING, TENSION		180	3-695-719-01	SPRING, TENSION	
160	X-3712-037-1	LEVER (A) ASSY (2)		181	X-3695-415-1	PINCH LEVER ASSY	
161	3-315-384-31	WASHER, STOPPER		182	3-695-624-01	BASE, PROTECT	
162	X-3712-025-1	GEAR ASSY, TS		183	X-3712-027-1	ARM ASSY (2), TG7	
163	3-699-402-01	SCREW (M1.3X5.5), TAPPING		184	3-695-541-01	SPRING	
164	3-712-165-01	PLATE (2), STOPPER		185	3-712-158-01	FLANGE, UPPER, TG7	
165	A-7060-693-A	FP-53 BOARD, COMPLETE		186	3-712-160-01	SLEEVE (2), TG7	
166	3-695-698-01	GUIDE, LS		187	3-712-159-01	FLANGE, LOWER, TG7	
167	3-695-697-01	SPRING, LEAF, LS		188	3-712-157-01	SPRING, COMPRESSION	
168	X-3695-436-1	TABLE ASSY, REEL, TAKE-UP		189	X-3712-035-1	CHASSIS ASSY (2), LS	
169	X-3712-038-1	TABLE ASSY (2), REEL, SUPPLY	190	190	3-701-444-01	WASHER, 6	
170	3-542-475-00	SPRING, TENSION		191	3-321-393-01	WASHER, STOPPER	
171	3-712-151-01	BRAKE (2), SOFT					

## 5-5. CHASSIS ASSEMBLY (1)



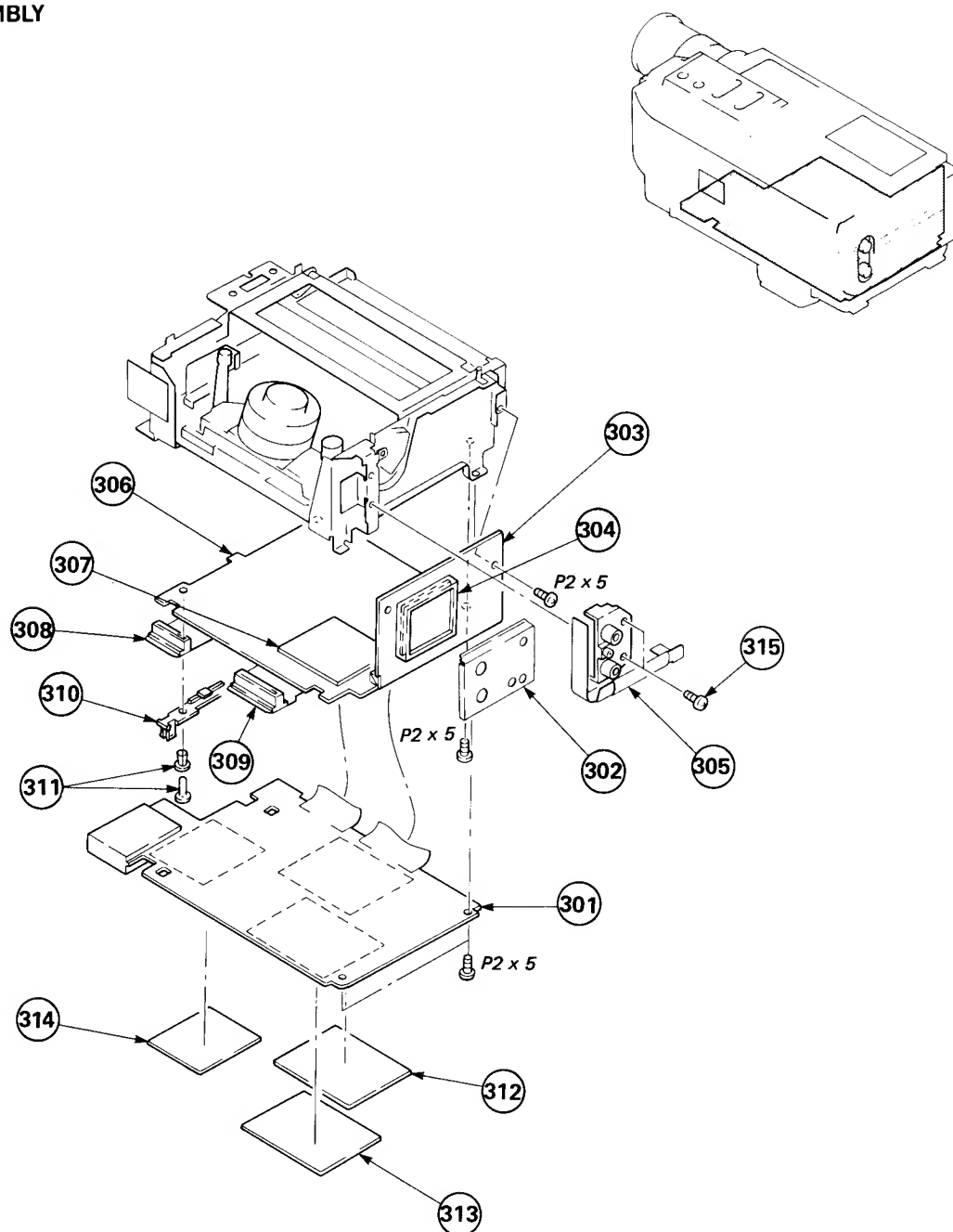
No.	Part No.	Description	Remark	No.	Part No.	Description	Remark
201	3-315-384-31	WASHER, STOPPER		216	X-3695-417-1	GEAR (C) ASSY, LS	
202	X-3712-023-1	ARM (A) ASSY (2), PINCH		217	*3-695-705-01	SPRING (S)	
203	3-695-589-01	LEVER (B), REEL LOCK		218	3-713-937-01	SPRING (A) (2)	
204	3-669-465-00	WASHER (1.5), STOPPER		219	X-3695-418-1	ARM ASSY, LOCK	
205	X-3695-439-1	SLIDER ASSY, M		220	3-695-574-01	ARM, RETURN PREVENTION	
206	X-3712-031-1	CAM ASSY (2)		221	3-695-579-01	SPRING (B), TORSION	
207	3-712-156-01	GEAR (M) (2), THREADING		222	X-3712-018-1	BASE ASSY (2), LOCK	
208	3-695-537-01	GEAR (T), THREADING		223	1-553-226-00	SWITCH, LEAF (CCD SW) S902	
209	3-695-536-01	GEAR (S), THREADING		224	X-3695-438-1	ARM ASSY, EJECT	
210	*3-695-706-01	SPRING (T)		225	3-321-393-01	WASHER, STOPPER	
211	3-695-559-01	GEAR (B), THREADING		226	3-712-150-01	WHEEL, WORM	
212	3-695-724-01	GEAR (D), THREADING		227	X-3712-017-1	HOLDER ASSY, MOTOR	
213	3-712-162-02	GEAR (C) (2), THREADING		228	1-541-508-11	MOTOR, DC LA14-323F (LOADING) $\times$ 903	
214	3-695-714-01	GEAR (A), LS		229	X-3712-036-1	CHASSIS ASSY (2), MECHANICAL	
215	3-695-563-04	GEAR (B), LS		230	1-161-032-00	CAP, CERAMIC 0.01MF	

## 5-6. CHASSIS ASSEMBLY (2)



No.	Part No.	Description	Remark	No.	Part No.	Description	Remark
251	X-3712-029-1	ROLLER ASSY (2), GUIDE		271	8-835-223-01	MOTOR, DC BHF-3301B (CAPSTAN) M902	
252	X-3712-030-1	BASE ASSY (2), TG5		272	3-712-161-01	CLAMP	
253	3-695-770-01	SCREW, GR LOCK		273	3-695-627-01	STOPPER, SLIDER, S	
254	3-695-545-01	JOINT, T		274	3-695-628-01	STOPPER, SLIDER, T	
255	3-321-393-01	WASHER, STOPPER		275	3-695-677-01	SPRING (T), LEAF	
256	X-3712-028-1	BASE ASSY (2), TG4		276	3-695-519-01	SCREW, FITTING, LEAF SPRING(T)	
257	X-3695-429-1	JOINT ASSY, S		277	3-695-532-01	SPRING, COMPRESSION	
258	3-315-384-31	WASHER, STOPPER		278	3-695-727-01	RETAINER, FLANGE, UPPER	
259	X-3695-414-1	SLIDER (T) ASSY, THREADING		279	3-695-794-01	FLANGE, LOWER, TG2	
260	3-695-773-01	SPRING, TENSION		280	3-695-530-01	SLEEVE, TG2	
261	3-695-544-01	ROLLER, GUIDE		281	3-712-164-01	ROLLER (2), TG2	
262	3-695-772-01	SPRING, TENSION		282	3-695-528-01	FLANGE, TG2	
263	X-3695-428-1	SLIDER (S) ASSY, THREADING		283	3-695-529-01	NUT, TG2	
264	X-3712-024-1	ARM ASSY (2), GEAR		284	1-807-238-11	SENSOR, DEW CONDENSATION	
265	X-3712-020-1	BASE ASSY (2), MIDWAY PULLEY		285	A-7048-081-A	DRUM ASSY (DGR-19A-R)	286-290
266	X-3712-021-1	PULLEY ASSY (2), MIDWAY		286	3-686-422-01	WASHER (2X2.7), BOLT, HOLE	
267	3-712-163-01	SUPPORT (2), SLIDER		287	3-686-403-01	SCREW (2X5), BOLT WASHER	
268	1-535-574-11	TERMINAL, SHAFT GROUND		288	A-7049-107-A	DRUM ASSY, UPPER (DGR-19-R)	
269	X-3695-413-1	GEAR ASSY, CHANGE		289	3-686-444-02	SCREW +P 2X5.5	
270	3-695-637-01	BELT, RELAY		290	3-686-458-01	SCREW (P1.4X2.5), TAPPING	

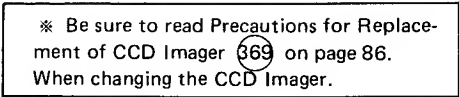
## 5-7. MAIN BOARD ASSEMBLY



No.	Part No.	Description
301	*A-7060-878-A	MV-12 BOARD, COMPLETE
302	*3-713-990-01	CASE (UPPER), SHIELD, RP
303	*A-7060-772-A	MR-8 BOARD, COMPLETE
304	*A-7068-074-A	RP-34 BOARD, COMPLETE
305	*A-7070-508-A	FP-49 BOARD, COMPLETE
306	*A-7060-790-A	SS-70 BOARD, COMPLETE
307	*A-7060-771-A	AU-31 BOARD, COMPLETE
308	A-7090-594-A	CONNECTOR BLOCK ASSY (A)

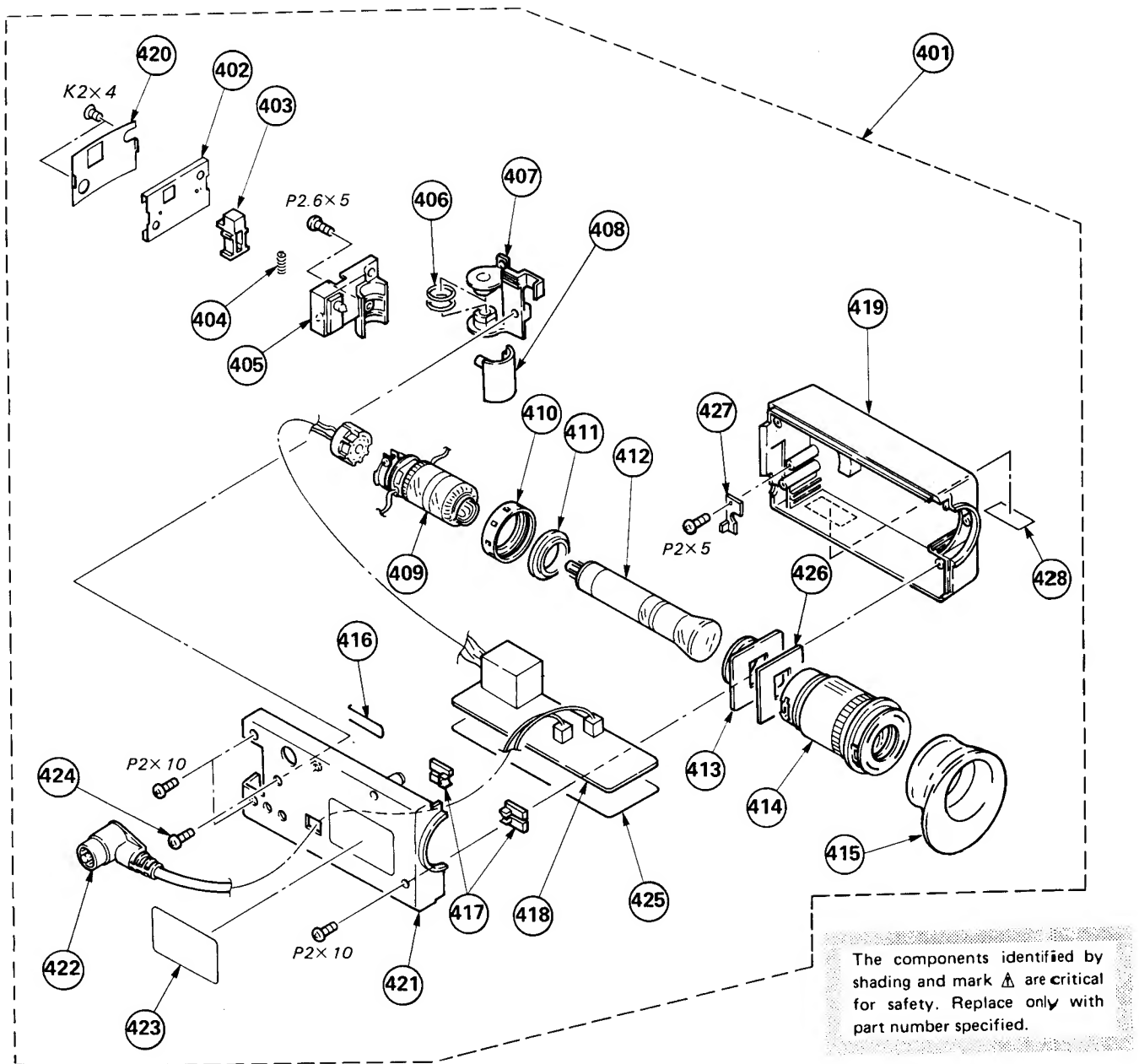
Remark	No.	Part No.	Description	Remark
312-314	309	A-7090-595-A	CONNECTOR BLOCK ASSY (B)	
	310	3-713-761-01	HOLDER, MV PC BOARD	
304	311	3-531-576-11	RIVET	
	312	A-7068-070-A	VC-11 BOARD, COMPLETE (HIC)	
	313	A-7068-071-A	VY-9 BOARD, COMPLETE (HIC)	
307-309	314	A-7068-072-A	VD-6 BOARD, COMPLETE (HIC)	
	315	3-686-999-41	SCREW (2.6X5) (C LOCK), (+) B	





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## 5-9. EVF ASSEMBLY



No.	Part No.	Description	Remark	No.	Part No.	Description	Remark
401	A-7019-051-A	EVF ASSY (AEP/E MODEL)	402-427	414	A-7080-263-A	FINDER BLOCK ASSY	
	A-7019-054-A	EVF ASSY (UK MODEL)	402-428	415	3-713-548-01	CUP, EYE	
402	3-713-550-01	LINING, EVF		416	3-713-533-01	SHAFT, HINGE LOCK	
403	3-713-742-01	BUTTON, LOCK		417	3-712-184-01	RETAINER, CORD	
404	3-480-102-00	SPRING, COMPRESSION		418	*A-7060-777-A	VF-10 BOARD, COMPLETE	427
405	X-3686-905-1	HINGE (A) ASSY, EVF		419	X-3712-052-1	CABINET (UPPER) ASSY, EVF	
406	3-146-316-11	RING, RUBBER		420	3-713-781-01	LINING, SPRING	
407	3-713-741-01	BASE, HINGE		421	X-3712-053-2	CABINET (LOWER) ASSY, EVF	
408	3-713-556-01	HINGE (B), EVF		422	1-556-824-61	CORD, CONNECTION (WITH PLUG) 8P	
409	$\Delta$ 1-451-296-21	DEFLECTION YOKE (BLACK & WHITE)		423	*3-713-519-01	LABEL, MODEL NUMBER, EVF AEP MODEL	
410	3-713-534-01	RETAINER, CRT			*3-713-518-01	LABEL, MODEL NUMBER, EVF UK MODEL	
411	*3-712-660-01	RING, RUBBER		424	3-713-559-01	SCREW (2X6)	
412	$\Delta$ 1-546-061-11	CATHODE-RAY TUBE, B/W		425	*3-714-005-01	SHEET, INSULATING	
413	3-712-183-01	COVER, CRT		426	3-713-985-01	PLATE, CRT	
				427	*1-621-803-11	LD-7 BOARD	
				428	*3-704-235-01	LABEL, CAUTION (UK MODEL)	

## 5-10. HARDWEAR LIST

### SCREW

7-621-255-45 SCREW +P 2X6  
7-621-255-85 SCREW +P 2X14  
7-621-284-10 SCREW +P 2.6X5  
7-621-591-00 SCREW +K 2X4  
7-627-553-67 SCREW, PRECISION +P 2X5  
  
7-627-850-17 SCREW, PRECISION +P 1.4X2.5  
7-627-552-07 SCREW, PRECISION +P 1.7X2.5  
7-627-852-18 SCREW, PRECISION +P 1.7X4 TYPE3  
7-627-852-38 SCREW, PRECISION +P1.7X1.8TYPE3  
7-627-553-37 PRECISION SCREW +P 2X3 TYPE 3  
  
7-627-853-58 SCREW, PRECISION +P 2X5 TYPE3  
7-685-103-19 SCREW +P 2X5 TYPE2 NON-SLIT  
7-685-104-19 SCREW +P 2X6 TYPE2 NON-SLIT  
7-685-105-19 SCREW +P 2X8 TYPE2 NON-SLIT  
7-685-106-19 SCREW +P 2X10 TYPE2 NON-SLIT  
  
7-685-134-19 SCREW +P 2.6X8 TYPE2 NON-SLIT  
7-685-134-19 SCREW +BTP 2.6X8 TYPE2 N-S

### NUT

7-622-205-05 NUT M2 TYPE2

### WASHER

7-623-922-01 WASHER 2.0, NYLONE

### STOP RING

7-624-101-01 STOP RING 1.2 (E TYPE)  
7-624-102-04 STOP RING 1.5, TYPE -E

# SECTION 6 ELECTRICAL PARTS LIST

**CAMERA BOARD ASSY**

**VC-20**

**DT-61 SH-2**

## NOTE:

The components identified by shading and mark  $\Delta$  are critical for safety. Replace only with part number specified.

When indicating parts by reference number, please include the board name.

- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.

- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.

## RESISTORS

- All resistors are in ohms
- F : nonflammable

- Items marked "\*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

## CAPACITORS

- MF :  $\mu$ F, PF :  $\mu$ F

## COILS

- MMH : mH, UH :  $\mu$ H

Ref.No	Part No.	Description	Remark	Ref.No	Part No.	Description	Remark
*A-7030-065-A		CAM BOARD ASSY ***** (Including the VC-20, VC-21, VC-22, CN-27, MA-21, DS-24, SW-71, AW-9, AS-20, SK-21, and RZ-1 Board)		C761	1-124-222-00	ELECT 22MF	20% 6.3V
1-623-012-11	FP-80	FLEXIBLE BOARD		C762	1-163-021-00	CERAMIC CHIP 0.01MF	10% 50V
1-623-013-12	FP-81	FLEXIBLE BOARD		C763	1-131-387-00	TANTALUM 47MF	10% 6.3V
1-623-019-11	FP-82	FLEXIBLE BOARD		C764	1-124-234-00	ELECT 22MF	20% 16V
*A-7060-882-A		VC-20 BOARD, COMPLETE *****		C765	1-163-021-00	CERAMIC CHIP 0.01MF	10% 50V
A-7068-056-A		DT-61 BOARD (HIC), COMPLETE		C766	1-163-021-00	CERAMIC CHIP 0.01MF	10% 50V
*A-7068-088-A		SH-2 BOARD (HIC), COMPLETE		C767	1-124-234-00	ELECT 22MF	20% 16V
CAPACITOR				C768	1-163-077-00	CERAMIC CHIP 0.1MF	50V
C701	1-162-637-11	CERAMIC CHIP 0.47MF	16V	C769	1-163-077-00	CERAMIC CHIP 0.1MF	50V
C702	1-162-637-11	CERAMIC CHIP 0.47MF	16V	C770	1-124-234-00	ELECT 22MF	20% 16V
C703	1-135-083-00	TANTAL. CHIP 0.47MF	20% 25V	C771	1-163-021-00	CERAMIC CHIP 0.01MF	10% 50V
C704	1-135-083-00	TANTAL. CHIP 0.47MF	20% 25V	C772	1-163-021-00	CERAMIC CHIP 0.01MF	10% 50V
C705	1-162-637-11	CERAMIC CHIP 0.47MF	16V	C773	1-124-234-00	ELECT 22MF	20% 16V
C706	1-163-129-00	CERAMIC CHIP 330PF	5% 50V	C774	1-163-035-00	CERAMIC CHIP 0.047MF	10% 25V
C707	1-162-637-11	CERAMIC CHIP 0.47MF	16V	C775	1-163-035-00	CERAMIC CHIP 0.047MF	10% 25V
C708	1-163-101-00	CERAMIC CHIP 22PF	5% 50V	C776	1-163-035-00	CERAMIC CHIP 0.047MF	50V
C709	1-163-101-00	CERAMIC CHIP 22PF	5% 50V	TRIMMER			
C710	1-163-109-00	CERAMIC CHIP 47PF	5% 50V	CT721	1-141-331-11	CAP, VAR, TRIMMER (CHIP) 30P	
C721	1-163-089-00	CERAMIC CHIP 6PF	0.5PF 50V	CT731	1-141-329-11	CAP, VAR, TRIMMER (CHIP) 10P	
C722	1-163-111-00	CERAMIC CHIP 56PF	5% 50V	DIODE			
C723	1-163-111-00	CERAMIC CHIP 56PF	5% 50V	D701	8-719-801-45	DIODE 1SS187	
C724	1-163-021-00	CERAMIC CHIP 0.01MF	10% 50V	D731	8-713-200-00	DIODE 1T32-2	
C725	1-163-021-00	CERAMIC CHIP 0.01MF	10% 50V	IC			
C726	1-163-035-00	CERAMIC CHIP 0.047MF	10% 25V	*IC701	8-750-010-33	IC IU021CK-AA	
C732	1-163-109-00	CERAMIC CHIP 47PF	5% 50V	IC731	8-752-321-16	IC CXD1030M	
C733	1-163-109-00	CERAMIC CHIP 47PF	5% 50V	COIL			
C734	1-163-101-00	CERAMIC CHIP 22PF	5% 50V	L731	1-410-389-11	INDUCTOR CHIP 47UH	
C735	1-163-021-00	CERAMIC CHIP 0.01MF	10% 50V	L761	1-407-165-XX	MICRO INDUCTOR 47UH	
C736	1-135-091-00	TANTAL. CHIP 1MF	20% 16V	L762	1-408-960-21	MICRO INDUCTOR 1.5UH	
C737	1-163-141-00	CERAMIC CHIP 0.001MF	10% 50V	L763	1-408-960-21	MICRO INDUCTOR 1.5UH	
C738	1-163-109-00	CERAMIC CHIP 47PF	5% 50V	L764	1-407-165-XX	MICRO INDUCTOR 47UH	
C739	1-163-021-00	CERAMIC CHIP 0.01MF	10% 50V	TRANSISTOR			
C740	1-163-021-00	CERAMIC CHIP 0.01MF	10% 50V	Q701	8-729-100-67	TRANSISTOR 2SC1623-L7	
C741	1-163-021-00	CERAMIC CHIP 0.01MF	10% 50V	Q721	8-729-175-73	TRANSISTOR 2SC2757	
C742	1-163-101-00	CERAMIC CHIP 22PF	5% 50V	Q722	8-729-175-72	TRANSISTOR 2SC2757-T34	
C743	1-163-101-00	CERAMIC CHIP 22PF	5% 50V	Q731	8-729-100-76	TRANSISTOR 2SA812	
C744	1-163-021-00	CERAMIC CHIP 0.01MF	10% 50V	Q732	8-729-100-67	TRANSISTOR 2SC1623-L7	
C745	1-135-100-21	TANTAL. CHIP 6.8MF	20% 6.3V	RESISTOR			
C746	1-163-035-00	CERAMIC CHIP 0.047MF	10% 25V	R701	1-216-075-00	METAL CHIP 12K 5%	1/10W
C751	1-124-229-00	ELECT 33MF	20% 10V	R702	1-216-089-00	METAL CHIP 47K 5%	1/10W
C752	1-163-013-00	CERAMIC CHIP 0.0022MF	10% 50V	R703	1-216-075-00	METAL CHIP 12K 5%	1/10W
C753	1-163-013-00	CERAMIC CHIP 0.0022MF	10% 50V	R704	1-216-091-00	METAL CHIP 56K 5%	1/10W
C754	1-163-105-00	CERAMIC CHIP 33PF	5% 50V	R705	1-216-089-00	METAL CHIP 47K 5%	1/10W
C755	1-163-105-00	CERAMIC CHIP 33PF	5% 50V	R706	1-216-067-00	METAL CHIP 5.6K 5%	1/10W
				R707	1-216-025-00	METAL CHIP 100 5%	1/10W
				R708	1-216-061-00	METAL CHIP 3.3K 5%	1/10W
				R709	1-216-057-00	METAL CHIP 2.2K 5%	1/10W

\* The IC701 and IC002 have not been mounted on the already mounted VC-20 board and DT-61 board respectively.

Be sure to read "Precautions for Replacement of CCD Imager" on page 86. When changing the mounted VC-20 board and CCD Imager.

VC-20

VC-21

MX-2

VC-22

IA-1

Ref.No	Part No.	Description	Remark
R721	1-216-067-00	METAL CHIP 5.6K 5% 1/10W	
R722	1-216-067-00	METAL CHIP 5.6K 5% 1/10W	
R723	1-216-039-00	METAL CHIP 390 5% 1/10W	
R724	1-216-039-00	METAL CHIP 390 5% 1/10W	
R725	1-216-081-00	METAL CHIP 22K 5% 1/10W	
R726	1-216-041-00	METAL CHIP 470 5% 1/10W	
R727	1-216-053-00	METAL CHIP 1.5K 5% 1/10W	
R732	1-216-057-00	METAL CHIP 2.2K 5% 1/10W	
R733	1-216-057-00	METAL CHIP 2.2K 5% 1/10W	
R734	1-216-065-00	METAL CHIP 4.7K 5% 1/10W	
R735	1-216-077-00	METAL CHIP 15K 5% 1/10W	
R736	1-216-069-00	METAL CHIP 6.8K 5% 1/10W	
R738	1-216-057-00	METAL CHIP 2.2K 5% 1/10W	
R739	1-216-295-00	METAL CHIP 0 5% 1/10W	
R740	1-216-025-00	METAL CHIP 100 5% 1/10W	
R741	1-216-093-00	METAL CHIP 68K 5% 1/10W	
R742	1-216-121-00	METAL CHIP 1M 5% 1/10W	
R743	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R744	1-216-097-00	METAL CHIP 100K 5% 1/10W	
R745	1-216-033-00	METAL CHIP 220 5% 1/10W	
R746	1-216-053-00	METAL CHIP 1.5K 5% 1/10W	
R747	1-216-045-00	METAL CHIP 680 5% 1/10W	
R751	1-216-025-00	METAL CHIP 100 5% 1/10W	
R752	1-216-049-00	METAL CHIP 1K 5% 1/10W	

CRYSTAL

X721	1-567-732-12	VIBRATOR, CRYSTAL 28.3750MHz
X731	1-567-733-11	VIBRATOR, CRYSTAL 17.7MHz

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\*A-7060-880-A VC-21 BOARD, COMPLETE  
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A-7060-835-A MX-2 BOARD (HIC), COMPLETE

CAPACITOR

C781	1-163-077-00	CERAMIC CHIP 0.1MF	50V
C782	1-163-077-00	CERAMIC CHIP 0.1MF	50V
C783	1-163-213-00	CERAMIC CHIP 0.0022MF	10% 50V
C784	1-163-213-00	CERAMIC CHIP 0.0022MF	10% 50V
C785	1-163-213-00	CERAMIC CHIP 0.0022MF	10% 50V
C786	1-124-234-00	ELECT 22MF	20% 10V
C787	1-163-021-00	CERAMIC CHIP 0.01MF	10% 50V
C788	1-163-021-00	CERAMIC CHIP 0.01MF	10% 50V
C789	1-124-584-00	ELECT 100MF	20% 10V
C790	1-135-105-00	TANTAL. CHIP 33MF	20% 4V
C791	1-135-105-00	TANTAL. CHIP 33MF	20% 4V

FILTER

FL781	1-235-442-11	FILTER, LOW PASS (YH)
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Ref.No	Part No.	Description	Remark
<u>IC</u>			
IC781	8-759-914-44	IC TL431CLPB	
<u>COIL</u>			
L781	1-408-767-21	INDUCTOR CHIP 1.5UH	
L782	1-410-369-11	INDUCTOR CHIP 1UH	
L783	1-410-337-11	MICRO INDUCTOR 1UH	
L784	1-410-337-11	MICRO INDUCTOR 1UH	
L785	1-410-369-11	INDUCTOR CHIP 1UH	
L786	1-408-785-21	INDUCTOR CHIP 47UH	
L787	1-408-777-00	INDUCTOR CHIP 10UH	
<u>RESISTOR</u>			
R781	1-216-069-00	METAL CHIP 6.8K 5% 1/10W	
R782	1-216-069-00	METAL CHIP 6.8K 5% 1/10W	
R783	1-216-069-00	METAL CHIP 6.8K 5% 1/10W	
R784	1-216-069-00	METAL CHIP 6.8K 5% 1/10W	
R785	1-216-069-00	METAL CHIP 6.8K 5% 1/10W	
R786	1-216-081-00	METAL CHIP 22K 5% 1/10W	
R787	1-216-069-00	METAL CHIP 6.8K 5% 1/10W	
R788	1-216-081-00	METAL CHIP 22K 5% 1/10W	
R789	1-216-081-00	METAL CHIP 22K 5% 1/10W	
R790	1-216-081-00	METAL CHIP 22K 5% 1/10W	
R791	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R792	1-216-061-00	METAL CHIP 3.3K 5% 1/10W	
R793	1-216-061-00	METAL CHIP 3.3K 5% 1/10W	
R794	1-216-067-00	METAL CHIP 5.6K 5% 1/10W	
R795	1-216-061-00	METAL CHIP 3.3K 5% 1/10W	
R796	1-216-069-00	METAL CHIP 6.8K 5% 1/10W	

VARIABLE RESISTOR

RV781	1-230-523-11	RES, ADJ, METAL GLAZE 10K
RV782	1-230-523-11	RES, ADJ, METAL GLAZE 10K

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\*A-7060-881-A VC-22 BOARD, COMPLETE  
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\*A-7060-888-A IA-1 BOARD (HIC), COMPLETE

CAPACITOR

C801	1-163-021-00	CERAMIC CHIP 0.01MF	10% 50V
C802	1-163-021-00	CERAMIC CHIP 0.01MF	10% 50V
C803	1-163-013-00	CERAMIC CHIP 0.0022MF	10% 50V
C804	1-163-077-00	CERAMIC CHIP 0.1MF	50V
C805	1-163-077-00	CERAMIC CHIP 0.1MF	50V
C806	1-163-077-00	CERAMIC CHIP 0.1MF	50V
C807	1-163-077-00	CERAMIC CHIP 0.1MF	50V
C808	1-135-085-21	TANTAL. CHIP 4.7MF	20% 16V
C809	1-163-077-00	CERAMIC CHIP 0.1MF	50V
C810	1-135-093-21	TANTAL. CHIP 10MF	20% 6.3V

When indicating parts by reference number, please include the board name.



Ref.No	Part No.	Description	Remark	Ref.No	Part No.	Description	Remark
C811	1-162-638-11	CERAMIC CHIP 1MF	16V	R814	1-216-081-00	METAL CHIP 22K 5%	1/10W
C812	1-135-101-21	TANTAL. CHIP 22MF	20% 6.3V	R815	1-216-081-00	METAL CHIP 22K 5%	1/10W
C813	1-163-077-00	CERAMIC CHIP 0.1MF	50V	R816	1-216-081-00	METAL CHIP 22K 5%	1/10W
C814	1-163-103-00	CERAMIC CHIP 27PF	5% 50V	R818	1-216-081-00	METAL CHIP 22K 5%	1/10W
C815	1-135-093-21	TANTAL. CHIP 10MF	20% 10V	R819	1-216-081-00	METAL CHIP 22K 5%	1/10W
C816	1-135-093-21	TANTAL. CHIP 10MF	20% 10V	R820	1-216-081-00	METAL CHIP 22K 5%	1/10W
C817	1-163-117-00	CERAMIC CHIP 100PF	5% 50V	R821	1-216-081-00	METAL CHIP 22K 5%	1/10W
C861	1-135-092-21	TANTAL. CHIP 3.3MF	20% 16V	R822	1-216-081-00	METAL CHIP 22K 5%	1/10W
C862	1-124-225-00	ELECT 100MF	20% 6.3V	R823	1-216-748-11	METAL CHIP 39K 5%	1/10W
C863	1-163-081-00	CERAMIC CHIP 0.22MF	25V	R824	1-216-061-00	METAL CHIP 3.3K 5%	1/10W
C881	1-135-101-21	TANTAL. CHIP 22MF	20% 6.3V	R825	1-216-053-00	METAL CHIP 1.5K 5%	1/10W
C882	1-163-021-00	CERAMIC CHIP 0.01MF	10% 50V	R826	1-216-061-00	METAL CHIP 3.3K 5%	1/10W
C883	1-163-021-00	CERAMIC CHIP 0.01MF	10% 50V	R827	1-216-071-00	METAL CHIP 8.2K 5%	1/10W
C884	1-124-225-00	ELECT 100MF	20% 6.3V	R828	1-216-065-00	METAL CHIP 4.7K 5%	1/10W
<u>DIODE</u>				R829	1-216-075-00	METAL CHIP 12K 5%	1/10W
D801	8-719-801-45	DIODE 1S5187		R830	1-216-097-00	METAL CHIP 100K 5%	1/10W
D802	8-719-100-05	DIODE 1S2837		R831	1-216-061-00	METAL CHIP 3.3K 5%	1/10W
D861	8-719-100-05	DIODE 1S2837		R832	1-216-065-00	METAL CHIP 4.7K 5%	1/10W
<u>IC</u>				R833	1-216-063-00	METAL CHIP 3.9K 5%	1/10W
IC801	8-759-908-11	IC CX20055		R834	1-216-053-00	METAL CHIP 1.5K 5%	1/10W
<u>COIL</u>				R835	1-216-065-00	METAL CHIP 4.7K 5%	1/10W
L801	1-408-785-21	INDUCTOR CHIP 47UH		R836	1-216-065-00	METAL CHIP 4.7K 5%	1/10W
L881	1-407-165-XX	MICRO INDUCTOR 47UH		R837	1-216-057-00	METAL CHIP 2.2K 5%	1/10W
<u>TRANSISTOR</u>				R838	1-249-429-11	***** 10K 5%	1/32W
Q801	8-729-100-67	TRANSISTOR 2SC1623-L7		R838	1-216-047-00	METAL CHIP 820 5%	1/10W
Q802	8-729-100-67	TRANSISTOR 2SC1623-L7		R839	1-249-430-11	***** 12K 5%	1/32W
Q803	8-729-100-67	TRANSISTOR 2SC1623-L7		R839	1-216-055-00	METAL CHIP 1.8K 5%	1/10W
Q804	8-729-100-66	TRANSISTOR 2SA812		R861	1-216-073-00	METAL CHIP 10K 5%	1/10W
Q805	8-729-100-66	TRANSISTOR 2SA812		R862	1-216-073-00	METAL CHIP 10K 5%	1/10W
Q806	8-729-100-67	TRANSISTOR 2SC1623-L7		R863	1-216-079-00	METAL CHIP 18K 5%	1/10W
Q807	8-729-100-67	TRANSISTOR 2SC1623-L7		R864	1-216-085-00	METAL CHIP 33K 5%	1/10W
Q808	8-729-100-67	TRANSISTOR 2SC1623-L7		R866	1-216-295-00	METAL CHIP 0 5%	1/10W
Q809	8-729-100-67	TRANSISTOR 2SC1623-L7		R867	1-216-053-00	METAL CHIP 1.5K 5%	1/10W
Q861	8-729-805-43	TRANSISTOR 2SC3396		R868	1-216-055-00	METAL CHIP 1.8K 5%	1/10W
<u>RESISTOR</u>				R869	1-216-295-00	METAL CHIP 0 5%	1/10W
R801	1-216-081-00	METAL CHIP 22K 5%	1/10W	<u>VARIABLE RESISTOR</u>			
R802	1-216-081-00	METAL CHIP 22K 5%	1/10W	RV801	1-230-870-11	RES, ADJ, METAL GLAZE 10K	
R803	1-216-091-00	METAL CHIP 56K 5%	1/10W	RV802	1-230-870-11	RES, ADJ, METAL GLAZE 10K	
R804	1-216-081-00	METAL CHIP 22K 5%	1/10W	RV803	1-230-870-11	RES, ADJ, METAL GLAZE 10K	
R805	1-216-081-00	METAL CHIP 22K 5%	1/10W	RV804	1-230-870-11	RES, ADJ, METAL GLAZE 10K	
R806	1-216-083-00	METAL CHIP 27K 5%	1/10W	RV805	1-230-870-11	RES, ADJ, METAL GLAZE 10K	
R807	1-216-083-00	METAL CHIP 27K 5%	1/10W	RV806	1-230-870-11	RES, ADJ, METAL GLAZE 10K	
R808	1-216-081-00	METAL CHIP 22K 5%	1/10W	RV808	1-230-870-11	RES, ADJ, METAL GLAZE 10K	
R809	1-216-081-00	METAL CHIP 22K 5%	1/10W	RV809	1-230-870-11	RES, ADJ, METAL GLAZE 10K	
R810	1-216-081-00	METAL CHIP 22K 5%	1/10W	RV810	1-230-870-11	RES, ADJ, METAL GLAZE 10K	
R811	1-216-081-00	METAL CHIP 22K 5%	1/10W	*****			
R812	1-216-081-00	METAL CHIP 22K 5%	1/10W	A-7060-961-A AF-32 BOARD, COMPLETE			
R813	1-216-081-00	METAL CHIP 22K 5%	1/10W	*****			
				<u>CAPACITOR</u>			
C001	1-163-021-00	CERAMIC CHIP 0.01MF	10% 50V				

When indicating parts by reference number, please include the board name.

**AF-32****AW-9**

Ref.No	Part No.	Description	Remark
C002	1-163-021-00	CERAMIC CHIP 0.01MF	10% 50V
C003	1-124-464-11	ELECT 0.22MF	20% 50V
C004	1-163-021-00	CERAMIC CHIP 0.01MF	10% 50V
C005	1-163-021-00	CERAMIC CHIP 0.01MF	10% 50V
C006	1-123-622-00	ELECT 22MF	20% 16V
C007	1-163-117-00	CERAMIC CHIP 0.0001MF	5% 50V
C008	1-163-141-00	CERAMIC CHIP 0.001MF	5% 50V
C009	1-123-321-00	ELECT 220MF	20% 16V
C010	1-163-021-00	CERAMIC CHIP 0.01MF	10% 50V

CONNECTOR

CN001	1-563-587-11	CONNECTOR, FLEXIBLE 10P
CN002	1-563-108-11	CONNECTOR, FLEXIBLE 5P
CN003	1-566-936-11	PIN, CONNECTOR 2P
CN004	1-566-937-11	PIN, CONNECTOR 3P

IC

IC001	9-990-857-01	IC HIM21
IC002	9-992-551-01	IC 80C 49AU-6691
IC003	9-990-855-01	IC LAG648

TRANSISTOR

Q001	8-729-103-16	TRANSISTOR 2SC1622A
Q002	8-729-101-07	TRANSISTOR 2SB798

RESISTOR

R001	1-216-097-00	METAL CHIP 100K	5%	1/10W
R002	1-216-295-00	METAL CHIP 0	5%	1/10W
R003	1-216-096-00	METAL CHIP 91K	5%	1/10W
R004	1-216-089-00	METAL CHIP 47K	5%	1/10W
R005	1-216-082-00	METAL CHIP 24K	5%	1/10W
R006	1-216-075-00	METAL CHIP 12K	5%	1/10W
R007	1-216-049-00	METAL CHIP 1K	5%	1/10W
R008	1-216-049-00	METAL CHIP 1K	5%	1/10W
R009	1-216-080-00	METAL CHIP 20K	5%	1/10W
R010	1-216-041-00	METAL CHIP 470	5%	1/10W
R011	1-216-061-00	METAL CHIP 3.3K	5%	1/10W
R012	1-216-082-00	METAL CHIP 24K	5%	1/10W
R013	1-216-304-11	METAL CHIP 3.3	5%	1/10W
R014	1-216-049-00	METAL CHIP 1K	5%	1/10W
R015	1-216-097-00	METAL CHIP 100K	5%	1/10W
R016	1-216-045-00	METAL CHIP 680	5%	1/10W
R017	1-216-053-00	METAL CHIP 1.5K	5%	1/10W

VARIABLE RESISTOR

VR001	1-230-287-00	RES, ADJ, METAL GLAZE 10K
VR002	1-237-485-00	RES, ADJ, METAL GLAZE 220K
VR003	1-237-579-00	RES, ADJ, METAL GLAZE 1K

VIBRATOR

X001	1-567-470-11	VIBRATOR, CERAMIC 6MHZ
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Ref.No	Part No.	Description	Remark
	*A-7070-497-A	AW-9 BOARD, COMPLETE	*****

CAPACITOR

C901	1-109-539-00	MICA 150PF	5%	100V
C902	1-130-475-00	MYLAR 0.0022MF	5%	50V
C903	1-124-462-00	ELECT 10MF	20%	6.3V
C904	1-163-077-00	CERAMIC CHIP 0.1MF		50V
C905	1-124-462-00	ELECT 10MF	20%	6.3V

C906	1-162-638-11	CERAMIC CHIP 1MF		16V
C907	1-163-104-00	CERAMIC CHIP 30PF	5%	50V
C908	1-163-104-00	CERAMIC CHIP 30PF	5%	50V
C911	1-162-637-11	CERAMIC CHIP 0.47MF		16V

CONNECTOR

CN901	*1-564-004-00	PIN, CONNECTOR 5P
CN902	*1-564-005-00	PIN, CONNECTOR 6P

DIODE

D901	8-719-100-03	DIODE 1S2835
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IC

IC901	8-759-906-53	IC TL062CPS
IC902	8-759-106-23	IC UPD4066BG
IC903	8-759-100-93	IC UPC393G2
IC904	8-759-011-87	IC MC146805F2FP-SC82435

TRANSISTOR

Q901	8-729-903-30	TRANSISTOR DTC144TK
Q902	8-729-903-30	TRANSISTOR DTC144TK
Q903	8-729-805-45	TRANSISTOR 2SC3395
Q904	8-729-805-45	TRANSISTOR 2SC3395
Q905	8-729-805-45	TRANSISTOR 2SC3395

Q906	8-729-805-45	TRANSISTOR 2SC3395
Q907	8-729-805-69	TRANSISTOR 2SA1341
Q908	8-729-805-69	TRANSISTOR 2SA1341
Q909	8-729-805-69	TRANSISTOR 2SA1341
Q910	8-729-805-69	TRANSISTOR 2SA1341

Q911	8-729-805-69	TRANSISTOR 2SA1341
Q912	8-729-805-45	TRANSISTOR 2SC3395

RESISTOR

R901	1-216-049-00	METAL CHIP 1K	5%	1/10W
R902	1-216-055-00	METAL CHIP 1.8K	5%	1/10W
R903	1-216-049-00	METAL CHIP 1K	5%	1/10W
R904	1-216-057-00	METAL CHIP 2.2K	5%	1/10W
R905	1-216-073-00	METAL CHIP 10K	5%	1/10W

R906	1-216-085-00	METAL CHIP 33K	5%	1/10W
R907	1-216-077-00	METAL CHIP 15K	5%	1/10W
R908	1-216-067-00	METAL CHIP 5.6K	5%	1/10W
R909	1-216-073-00	METAL CHIP 10K	5%	1/10W
R910	1-216-073-00	METAL CHIP 10K	5%	1/10W

When indicating parts by reference number, please include the board name.

AW-9

AS-20

SW-71

RZ-1

DS-24

Ref.No	Part No.	Description	Remark	Ref.No	Part No.	Description	Remark
R911	1-216-073-00	METAL CHIP 10K 5%	1/10W	*A-7070-496-A RZ-1 BOARD, COMPLETE *****			
R912	1-216-097-00	METAL CHIP 100K 5%	1/10W				
R913	1-216-073-00	METAL CHIP 10K 5%	1/10W				
R914	1-216-121-00	METAL CHIP 1M 5%	1/10W				
R915	1-216-103-00	METAL CHIP 180K 5%	1/10W				
R916	1-216-097-00	METAL CHIP 100K 5%	1/10W				
R917	1-216-089-00	METAL CHIP 47K 5%	1/10W				
R918	1-216-081-00	METAL CHIP 22K 5%	1/10W				
R921	1-216-115-00	METAL CHIP 560K 5%	1/10W				
R922	1-216-107-00	METAL CHIP 270K 5%	1/10W				
R923	1-216-099-00	METAL CHIP 120K 5%	1/10W				
R924	1-216-093-00	METAL CHIP 68K 5%	1/10W				
R927	1-216-041-00	METAL CHIP 470 5%	1/10W				
R928	1-216-041-00	METAL CHIP 470 5%	1/10W				
R929	1-216-049-00	METAL CHIP 1K 5%	1/10W				
R930	1-216-097-00	METAL CHIP 100K 5%	1/10W				
R931	1-216-085-00	METAL CHIP 33K 5%	1/10W				
R932	1-216-075-00	METAL CHIP 12K 5%	1/10W				
VARIABLE RESISTOR							
RV901	1-230-871-11	RES, ADJ, METAL GLAZE 22K					
CRYSTAL							
X901	1-567-192-11	OSCILLATOR, CERAMIC					
*****							
	*1-623-016-22	AS-20 BOARD					
		*****					
	3-713-724-01	HOLDER, AS SENSOR					
BALANCE SENSOR							
SB901	1-807-684-11	SENSOR, WHITE BALANCE AM3208SN					
CONNECTOR							
W902	*1-506-592-11	PIN, BOARD TO BOARD 4P					
*****							
	*1-623-009-22	SW-71 BOARD					
		*****					
	9-911-839-XX	SPACER, BUTTON					
SWITCH							
S941	1-570-871-11	SWITCH, SLIDE					
S942	1-570-910-21	SWITCH, TACTIL (REFLOW TYPE)					
S943	1-570-909-21	SWITCH, TACTIL (REFLOW TYPE)					
S944	1-570-910-21	SWITCH, TACTIL (REFLOW TYPE)					
S945	1-570-870-11	SWITCH, SLIDE					
S946	1-570-910-21	SWITCH, TACTIL (REFLOW TYPE)					
S947	1-570-910-21	SWITCH, TACTIL (REFLOW TYPE)					

Ref.No	Part No.	Description	Remark
C102	1-163-125-00	CERAMIC CHIP 220PF	5% 50V
C103	1-163-121-00	CERAMIC CHIP 150PF	5% 50V
C104	1-163-121-00	CERAMIC CHIP 150PF	5% 50V
C105	1-163-021-00	CERAMIC CHIP 0.01MF	50V
C106	1-135-101-21	TANTAL. CHIP 22MF	20% 6.3V
C107	1-163-021-00	CERAMIC CHIP 0.01MF	50V
C108	1-163-121-00	CERAMIC CHIP 150PF	5% 50V
C109	1-163-121-00	CERAMIC CHIP 150PF	5% 50V
C110	1-163-125-00	CERAMIC CHIP 220PF	5% 50V
C111	1-163-115-00	CERAMIC CHIP 82PF	5% 50V
C112	1-163-115-00	CERAMIC CHIP 82PF	5% 50V
C113	1-163-125-00	CERAMIC CHIP 220PF	5% 50V
C114	1-163-095-00	CERAMIC CHIP 12PF	5% 50V
C115	1-163-077-00	CERAMIC CHIP 0.1MF	50V
C116	1-163-077-00	CERAMIC CHIP 0.1MF	50V
C117	1-163-038-00	CERAMIC CHIP 0.1MF	25V
C118	1-135-101-21	TANTAL. CHIP 22MF	20% 6.3V
C120	1-135-083-00	TANTAL. CHIP 0.47MF	20% 25V
C121	1-163-033-00	CERAMIC CHIP 0.022MF	10% 25V
C124	1-163-099-00	CERAMIC CHIP 18PF	5% 50V
C125	1-163-093-00	CERAMIC CHIP 10PF	5% 50V
C126	1-163-105-00	CERAMIC CHIP 33PF	5% 50V
C129	1-135-115-91	TANTAL. CHIP 10MF	20% 10V
C130	1-163-038-00	CERAMIC CHIP 0.1MF	25V
C131	1-135-083-00	TANTAL. CHIP 0.47MF	20% 25V
C132	1-163-038-00	CERAMIC CHIP 0.1MF	25V
C133	1-163-038-00	CERAMIC CHIP 0.1MF	25V
C134	1-163-038-00	CERAMIC CHIP 0.1MF	25V
C135	1-135-099-00	TANTAL. CHIP 2.2MF	20% 6.3V
C138	1-163-105-00	CERAMIC CHIP 33PF	5% 50V
C139	1-163-038-00	CERAMIC CHIP 0.1MF	25V
C140	1-135-098-21	TANTAL. CHIP 47MF	20% 6.3V
C141	1-163-133-00	CERAMIC CHIP 470PF	5% 50V
C142	1-163-109-00	CERAMIC CHIP 47PF	5% 50V
C143	1-161-013-11	CERAMIC 0.01MF	

## CONNECTOR

CN251	*1-564-012-00	PIN, CONNECTOR 2P
CN254	*1-564-013-00	PIN, CONNECTOR 3P
CN255	*1-564-017-00	PIN, CONNECTOR 7P
CN257	*1-564-013-00	PIN, CONNECTOR 3P
CN259	*1-563-608-11	CONNECTOR, FLEXIBLE 5P

CN861	*1-564-003-00	PIN, CONNECTOR 4P
CN881	*1-564-007-00	PIN, CONNECTOR 8P

## TRIMMER

CT101	1-141-331-21	CAP, VAR, TRIMMER (CHIP) 30P
CT102	1-141-359-51	CAP, VAR, TRIMMER (CHIP) 40P
CT103	1-141-296-21	CAP, VAR, TRIMMER (CHIP) 20P

## DELAY LINE

DL801	1-415-448-21	DELAY LINE
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Ref.No	Part No.	Description	Remark
<u>IC</u>			
IC101	8-752-032-48	IC CXA1157M	
IC102	8-759-945-24	IC MB673194U	
IC103	8-759-945-09	IC MB8464-12LLPF	
IC104	8-759-101-12	IC UPC311G2	
IC105	8-759-106-66	IC UPD74HC08G	
IC106	8-759-200-90	IC TC4538BF	
IC107	8-759-112-72	IC UPD6142G-101	
IC108	8-759-113-45	IC UPD7508BGB-502	
IC111	8-759-937-56	IC S-8054ALB-LM-S	
IC112	8-759-940-33	IC S-8052ALO-LG-S	
IC113	8-759-204-94	IC TC74HC00F	
<u>COIL</u>			
L101	1-410-377-11	INDUCTOR CHIP 4.7UH	
L104	1-410-387-11	INDUCTOR CHIP 33UH	
L105	1-410-369-11	INDUCTOR CHIP 1UH	
L107	1-410-390-11	INDUCTOR CHIP 56UH	
L108	1-410-369-11	INDUCTOR CHIP 1UH	
<u>TRANSISTOR</u>			
Q101	8-729-100-67	TRANSISTOR 2SC1623-L7	
Q102	8-729-100-67	TRANSISTOR 2SC1623-L7	
Q103	8-729-100-67	TRANSISTOR 2SC1623-L7	
Q104	8-729-100-76	TRANSISTOR 2SA812	
Q105	8-729-100-67	TRANSISTOR 2SC1623-L7	
Q106	8-729-100-76	TRANSISTOR 2SA812	
Q107	8-729-100-67	TRANSISTOR 2SC1623-L7	
Q108	8-729-100-67	TRANSISTOR 2SC1623-L7	
Q109	8-729-100-67	TRANSISTOR 2SC1623-L7	
Q110	8-729-100-67	TRANSISTOR 2SC1623-L7	
Q111	8-729-100-76	TRANSISTOR 2SA812	
Q113	8-729-900-51	TRANSISTOR DTA114TK	
Q114	8-729-901-03	TRANSISTOR DTC144WK	
Q115	8-729-100-76	TRANSISTOR 2SA812	
Q116	8-729-901-03	TRANSISTOR DTC144WK	
Q117	8-729-900-99	TRANSISTOR DTA144WK	
Q126	8-729-902-96	TRANSISTOR FMS1	
Q127	8-729-100-67	TRANSISTOR 2SC1623-L7	
Q128	8-729-109-42	TRANSISTOR 2SK94-X2	
<u>RESISTOR</u>			
R101	1-216-057-00	METAL CHIP 2.2K 5% 1/10W	
R102	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R103	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R104	1-216-069-00	METAL CHIP 6.8K 5% 1/10W	
R105	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R106	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R107	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R108	1-216-655-11	METAL CHIP 1.5K 0.50% 1/10W	
R109	1-216-665-11	METAL CHIP 3.9K 0.50% 1/10W	
R110	1-216-687-11	METAL CHIP 33K 0.50% 1/10W	

When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description	Remark
R111	1-216-657-11	METAL CHIP 1.8K 0.50% 1/10W	
R112	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R113	1-216-081-00	METAL CHIP 22K 5% 1/10W	
R114	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R115	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R116	1-216-657-11	METAL CHIP 1.8K 0.50% 1/10W	
R117	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R118	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R119	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R120	1-216-057-00	METAL CHIP 2.2K 5% 1/10W	
R121	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R122	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R123	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R124	1-216-041-00	METAL CHIP 470 5% 1/10W	
R125	1-216-679-81	METAL CHIP 15K 0.50% 1/10W	
R126	1-216-673-11	METAL CHIP 8.2K 0.50% 1/10W	
R127	1-216-689-11	METAL CHIP 39K 0.50% 1/10W	
R128	1-216-691-91	METAL CHIP 47K 0.50% 1/10W	
R129	1-216-057-00	METAL CHIP 2.2K 5% 1/10W	
R130	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R131	1-216-057-00	METAL CHIP 2.2K 5% 1/10W	
R132	1-216-089-00	METAL CHIP 47K 5% 1/10W	
R133	1-216-061-00	METAL CHIP 3.3K 5% 1/10W	
R134	1-216-061-00	METAL CHIP 3.3K 5% 1/10W	
R135	1-216-043-00	METAL CHIP 560 5% 1/10W	
R136	1-216-063-00	METAL CHIP 3.9K 5% 1/10W	
R137	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R138	1-216-295-00	METAL CHIP 0 5% 1/10W	
R140	1-216-113-00	METAL CHIP 470K 5% 1/10W	
R141	1-216-065-00	METAL CHIP 4.7K 5% 1/10W	
R142	1-216-097-00	METAL CHIP 100K 5% 1/10W	
R143	1-216-097-00	METAL CHIP 100K 5% 1/10W	
R144	1-216-097-00	METAL CHIP 100K 5% 1/10W	
R145	1-216-097-00	METAL CHIP 100K 5% 1/10W	
R146	1-216-097-00	METAL CHIP 100K 5% 1/10W	
R147	1-216-097-00	METAL CHIP 100K 5% 1/10W	
R148	1-216-069-00	METAL CHIP 6.8K 5% 1/10W	
R149	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R150	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R151	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R152	1-216-089-00	METAL CHIP 47K 5% 1/10W	
R153	1-216-109-00	METAL CHIP 330K 5% 1/10W	
R154	1-216-295-00	METAL CHIP 0 5% 1/10W	
R155	1-216-295-00	METAL CHIP 0 5% 1/10W	
R158	1-216-097-00	METAL CHIP 100K 5% 1/10W	
R159	1-216-097-00	METAL CHIP 100K 5% 1/10W	
R160	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R161	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R162	1-216-095-00	METAL CHIP 82K 5% 1/10W	
R163	1-216-105-00	METAL CHIP 220K 5% 1/10W	
R164	1-216-089-00	METAL CHIP 47K 5% 1/10W	
R165	1-216-067-00	METAL CHIP 5.6K 5% 1/10W	
R166	1-216-129-00	METAL CHIP 2.2M 5% 1/10W	

Ref.No	Part No.	Description	Remark
R167	1-216-097-00	METAL CHIP 100K 5% 1/10W	
R179	1-216-687-11	METAL CHIP 33K 0.50% 1/10W	
R180	1-216-063-00	METAL CHIP 3.9K 5% 1/10W	
R181	1-216-295-00	METAL CHIP 0 5% 1/10W	
R182	1-216-065-00	METAL CHIP 4.7K 5% 1/10W	
R183	1-216-693-91	METAL CHIP 56K 0.50% 1/10W	
R184	1-216-693-91	METAL CHIP 56K 0.50% 1/10W	
R185	1-216-065-00	METAL CHIP 4.7K 5% 1/10W	
R186	1-216-295-00	METAL CHIP 0 5% 1/10W	
R187	1-216-025-00	METAL CHIP 100 5% 1/10W	
R188	1-216-085-00	METAL CHIP 33K 5% 1/10W	
R189	1-216-105-00	METAL CHIP 220K 5% 1/10W	
R190	1-216-121-00	METAL CHIP 1M 5% 1/10W	
R191	1-216-686-11	METAL CHIP 30K 0.50% 1/10W	
R192	1-216-689-11	METAL CHIP 39K 0.50% 1/10W	
R193	1-216-121-00	METAL CHIP 1M 5% 1/10W	
R194	1-216-295-00	METAL CHIP 0 5% 1/10W	
R195	1-216-041-00	METAL CHIP 470 5% 1/10W	
R196	1-216-065-00	METAL CHIP 4.7K 5% 1/10W	
R199	1-216-041-00	METAL CHIP 470 5% 1/10W	

## VARIABLE RESISTOR

RV101	1-230-524-11	RES, ADJ, METAL GLAZE 22K
RV102	1-230-867-11	RES, ADJ, METAL GLAZE 1K

## CRYSTAL

X101	1-527-997-00	VIBRATOR, CRYSTAL 32.768KHz
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\*A-7070-469-A SK-21 FLEXIBLE BOARD, COMPLETE  
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## SWITCH

S948	1-554-371-31	SWITCH, TACT
S949	1-554-371-31	SWITCH, TACT
S950	1-554-371-31	SWITCH, TACT

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\*A-7070-467-A CN-27 BOARD, COMPLETE  
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## CAPACITOR

C892	1-163-101-00	CERAMIC CHIP 22PF	5%	50V
C893	1-163-117-00	CERAMIC CHIP 100PF	5%	50V
C894	1-163-021-00	CERAMIC CHIP 0.01MF	10%	50V
C895	1-163-021-00	CERAMIC CHIP 0.01MF	10%	50V

## COIL

L882	1-410-387-11	INDUCTOR CHIP 33UH
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## RESISTOR

R816	1-216-061-00	METAL CHIP 3.3K 5% 1/10W
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When indicating parts by reference number, please include the board name.



**CN-27****LI-3****MV-12****VC-11****VD-6****VY-9**

Ref.No	Part No.	Description	Remark
R817	1-216-067-00	METAL CHIP 5.6K 5% 1/10W	
R890	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R891	1-216-083-00	METAL CHIP 27K 5% 1/10W	
R892	1-216-295-00	METAL CHIP 0 5% 1/10W	

VARIABLE RESISTOR

RV807	1-230-867-11	RES, ADJ, METAL GLAZE 1K	
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*1-623-008-11	LI-3 BOARD	*****
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1-550-104-11	HOLDER, BATTERY	
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*A-7060-945-A	MV-12 BOARD, COMPLETE	*****
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A-7068-070-A	VC-11 BOARD (HIC), COMPLETE	
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A-7068-072-A	VD-6 BOARD (HIC), COMPLETE	
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A-7068-095-A	VY-9 BOARD (HIC), COMPLETE	
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1-558-895-11	WIRE, FLAT TYPE 18P	
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1-558-896-11	WIRE, FLAT TYPE 22P	
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CAPACITOR

C201	1-135-096-21	TANTAL. CHIP 4.7MF	10%	10V
C202	1-163-038-00	CERAMIC CHIP 0.1MF		25V
C203	1-163-021-00	CERAMIC CHIP 0.01MF	10%	50V
C204	1-163-115-00	CERAMIC CHIP 82PF	5%	50V
C205	1-163-105-00	CERAMIC CHIP 33PF	5%	50V
C206	1-163-145-00	CERAMIC CHIP 0.0015MF	5%	50V
C207	1-163-127-00	CERAMIC CHIP 270PF	5%	50V
C208	1-163-021-00	CERAMIC CHIP 0.01MF	10%	50V
C209	1-163-035-00	CERAMIC CHIP 0.047MF	10%	25V
C210	1-163-021-00	CERAMIC CHIP 0.01MF	10%	50V
C211	1-163-021-00	CERAMIC CHIP 0.01MF	10%	50V
C212	1-163-095-00	CERAMIC CHIP 12PF	5%	50V
C213	1-163-105-00	CERAMIC CHIP 33PF	5%	50V
C214	1-163-021-00	CERAMIC CHIP 0.01MF	10%	50V
C215	1-163-093-00	CERAMIC CHIP 10PF	5%	50V
C216	1-163-129-00	CERAMIC CHIP 330PF	5%	50V
C217	1-163-021-00	CERAMIC CHIP 0.01MF	10%	50V
C219	1-163-097-00	CERAMIC CHIP 15PF	5%	50V
C220	1-163-108-00	CERAMIC CHIP 43PF	5%	50V
C221	1-163-021-00	CERAMIC CHIP 0.01MF	10%	50V
C222	1-163-021-00	CERAMIC CHIP 0.01MF	10%	50V
C223	1-163-021-00	CERAMIC CHIP 0.01MF	10%	50V
C224	1-163-021-00	CERAMIC CHIP 0.01MF	10%	50V
C225	1-163-021-00	CERAMIC CHIP 0.01MF	10%	50V
C226	1-163-021-00	CERAMIC CHIP 0.01MF	10%	50V
C227	1-163-038-00	CERAMIC CHIP 0.1MF		25V

Ref.No	Part No.	Description	Remark
C228	1-163-101-00	CERAMIC CHIP 22PF	5% 50V
C229	1-163-145-00	CERAMIC CHIP 0.0015MF	5% 50V
C230	1-163-111-00	CERAMIC CHIP 56PF	5% 50V
C231	1-163-141-00	CERAMIC CHIP 0.001MF	5% 50V
C232	1-163-133-00	CERAMIC CHIP 470PF	5% 50V
C233	1-163-038-00	CERAMIC CHIP 0.1MF	25V
C234	1-163-038-00	CERAMIC CHIP 0.1MF	25V
C235	1-163-021-00	CERAMIC CHIP 0.01MF	10% 50V
C236	1-163-038-00	CERAMIC CHIP 0.1MF	25V
C237	1-124-462-00	ELECT 10MF	20% 16V
C238	1-163-021-00	CERAMIC CHIP 0.01MF	10% 50V
C239	1-131-379-00	TANTALUM 22MF	10% 10V
C240	1-163-111-00	CERAMIC CHIP 56PF	5% 50V
C241	1-124-222-00	ELECT 22MF	20% 6.3V
C242	1-124-222-00	ELECT 22MF	20% 6.3V
C243	1-163-038-00	CERAMIC CHIP 0.1MF	25V
C244	1-135-096-21	TANTAL. CHIP 4.7MF	10% 10V
C245	1-163-038-00	CERAMIC CHIP 0.1MF	25V
C246	1-124-442-00	ELECT 330MF	20% 6.3V
C247	1-135-096-21	TANTAL. CHIP 4.7MF	10% 10V
C248	1-163-021-00	CERAMIC CHIP 0.01MF	10% 50V
C249	1-163-021-00	CERAMIC CHIP 0.01MF	10% 50V
C250	1-163-038-00	CERAMIC CHIP 0.1MF	25V
C251	1-163-038-00	CERAMIC CHIP 0.1MF	25V
C252	1-163-021-00	CERAMIC CHIP 0.01MF	10% 50V
C253	1-163-133-00	CERAMIC CHIP 470PF	5% 50V
C254	1-163-021-00	CERAMIC CHIP 0.01MF	10% 50V
C255	1-163-105-00	CERAMIC CHIP 33PF	5% 50V
C256	1-163-093-00	CERAMIC CHIP 10PF	5% 50V
C257	1-163-101-00	CERAMIC CHIP 22PF	5% 50V
C258	1-163-088-00	CERAMIC CHIP 5PF	0.25PF 50V
C259	1-163-021-00	CERAMIC CHIP 0.01MF	10% 50V
C261	1-163-038-00	CERAMIC CHIP 0.1MF	25V
C262	1-163-129-00	CERAMIC CHIP 330PF	5% 50V
C263	1-163-038-00	CERAMIC CHIP 0.1MF	25V
C264	1-163-119-00	CERAMIC CHIP 120PF	5% 50V
C265	1-163-113-00	CERAMIC CHIP 68PF	5% 50V
C268	1-163-097-00	CERAMIC CHIP 15PF	5% 50V
C269	1-161-061-00	CERAMIC 0.068MF	10% 50V
C270	1-161-061-00	CERAMIC 0.068MF	10% 50V
C271	1-163-115-00	CERAMIC CHIP 82PF	5% 50V
C651	1-124-236-00	ELECT 47MF	20% 16V
C652	1-127-496-00	ELECT(SOLID) 6.8MF	20% 16V
C653	1-163-141-00	CERAMIC CHIP 0.001MF	5% 50V
C654	1-127-489-00	ELECT(SOLID) 10MF	20% 10V
C655	1-163-035-00	CERAMIC CHIP 0.047MF	10% 25V
C656	1-163-035-00	CERAMIC CHIP 0.047MF	10% 25V
C657	1-127-487-00	ELECT(SOLID) 4.7MF	20% 10V
C658	1-127-504-00	ELECT(SOLID) 4.7MF	20% 25V
C659	1-163-017-00	CERAMIC CHIP 0.0047MF	10% 50V
C660	1-163-021-00	CERAMIC CHIP 0.01MF	10% 50V
C661	1-163-125-00	CERAMIC CHIP 220PF	5% 50V
C662	1-163-015-00	CERAMIC CHIP 0.0033MF	10% 50V

When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description	Remark	Ref.No	Part No.	Description	Remark
C664	1-163-035-00	CERAMIC CHIP 0.047MF	10% 25V	L219	1-408-789-21	INDUCTOR CHIP 100UH	
C665	1-163-035-00	CERAMIC CHIP 0.047MF	10% 25V	L220	1-410-381-11	INDUCTOR CHIP 10UH	
C666	1-163-035-00	CERAMIC CHIP 0.047MF	10% 25V	L651	1-421-918-11	COIL, CHOKE 10UH	
<u>CONNECTOR</u>				L652	1-410-690-11	COIL, CHOKE 22UH	
CN203	*1-563-584-11	CONNECTOR, FLEXIBLE 7P		L653	1-408-773-31	INDUCTOR CHIP 4.7UH	
CN204	*1-563-609-11	CONNECTOR, FLEXIBLE 6P		L654	1-408-788-21	INDUCTOR CHIP 82UH	
CN205	*1-564-017-00	PIN, CONNECTOR 7P		L655	1-408-785-21	INDUCTOR CHIP 47UH	
CN206	*1-564-013-00	PIN, CONNECTOR 3P		L656	1-408-777-00	INDUCTOR CHIP 10UH	
CN207	1-562-183-00	SOCKET 8P		<u>VARIABLE COIL</u>			
<u>TRIMMER</u>				LV201	1-404-594-11	COIL, VARIABLE 10UH	
CV201	1-141-331-11	CAP, VAR, TRIMMER (CHIP) 30P		<u>IC LINK</u>			
<u>DIODE</u>				PS201	1-532-727-11	LINK, IC ICP-N5 0.25A	
D201	8-719-101-23	DIODE 1SS123		<u>TRANSISTOR</u>			
D202	8-719-106-44	DIODE RD9.1M-B2		Q201	8-729-100-67	TRANSISTOR 2SC1623-L7	
D203	8-719-106-44	DIODE RD9.1M-B2		Q202	8-729-100-67	TRANSISTOR 2SC1623-L7	
D204	8-719-106-44	DIODE RD9.1M-B2		Q203	8-729-805-45	TRANSISTOR 2SC3395	
D205	8-719-106-44	DIODE RD9.1M-B2		Q204	8-729-805-69	TRANSISTOR 2SA1341	
D206	8-719-106-44	DIODE RD9.1M-B2		Q205	8-729-100-67	TRANSISTOR 2SC1623-L7	
D207	8-719-101-23	DIODE 1SS123		Q206	8-729-805-45	TRANSISTOR 2SC3395	
D208	8-719-106-44	DIODE RD9.1M-B2		Q207	8-729-100-67	TRANSISTOR 2SC1623-L7	
D209	8-719-106-44	DIODE RD9.1M-B2		Q208	8-729-805-45	TRANSISTOR 2SC3395	
D651	8-719-200-36	DIODE E10QS04		Q209	8-729-100-67	TRANSISTOR 2SC1623-L7	
<u>DELAY LINE</u>				Q210	8-729-312-22	TRANSISTOR 2SA1122	
DL201	1-415-517-21	DELAY LINE, DUAL 1H-2H		Q211	8-729-805-45	TRANSISTOR 2SC3395	
<u>FILTER</u>				Q212	8-729-601-58	TRANSISTOR 2SC3053	
FL201	1-235-632-11	BPF		Q213	8-729-805-69	TRANSISTOR 2SA1341	
FL202	1-235-633-11	BPF		Q214	8-729-601-58	TRANSISTOR 2SC3053	
FL203	1-409-394-11	TRAP, CHROMA EMPHASIS		Q215	8-729-601-58	TRANSISTOR 2SC3053	
<u>IC</u>				Q216	8-729-312-22	TRANSISTOR 2SA1122	
IC204	8-759-107-89	IC UPD6105G-102		Q217	8-729-100-67	TRANSISTOR 2SC1623-L7	
IC651	8-759-937-36	IC TL1451ACNS		Q218	8-729-805-69	TRANSISTOR 2SA1341	
<u>COIL</u>				Q219	8-729-805-43	TRANSISTOR 2SC3396	
L201	1-408-789-21	INDUCTOR CHIP 100UH		Q220	8-729-117-54	TRANSISTOR 2SA1175	
L202	1-408-773-31	INDUCTOR CHIP 4.7UH		Q221	8-729-805-45	TRANSISTOR 2SC3395	
L203	1-408-795-21	INDUCTOR CHIP 330UH		Q222	8-729-805-45	TRANSISTOR 2SC3395	
L204	1-410-167-31	INDUCTOR CHIP 820UH		Q223	8-729-100-67	TRANSISTOR 2SC1623-L7	
L206	1-408-783-00	INDUCTOR CHIP 33UH		Q224	8-729-805-45	TRANSISTOR 2SC3395	
L207	1-410-381-11	INDUCTOR CHIP 10UH		Q227	8-729-805-45	TRANSISTOR 2SC3395	
L210	1-408-970-21	MICRO INDUCTOR 10UH		Q228	8-729-805-45	TRANSISTOR 2SC3395	
L211	1-407-166-XX	MICRO INDUCTOR 56UH		Q229	8-729-100-76	TRANSISTOR 2SA812	
L213	1-408-970-21	MICRO INDUCTOR 10UH		Q230	8-729-100-67	TRANSISTOR 2SC1623-L7	
L214	1-408-765-21	INDUCTOR CHIP 1UH		Q231	8-729-100-67	TRANSISTOR 2SC1623-L7	
L215	1-408-765-21	INDUCTOR CHIP 1UH		Q232	8-729-805-45	TRANSISTOR 2SC3395	
L216	1-408-982-11	MICRO INDUCTOR 100UH		Q233	8-729-100-67	TRANSISTOR 2SC1623-L7	
L217	1-408-982-11	MICRO INDUCTOR 100UH		Q652	8-729-805-67	TRANSISTOR 2SA1342	
L218	1-408-982-11	MICRO INDUCTOR 100UH		Q653	8-729-805-25	TRANSISTOR 2SB1121	
				Q654	8-729-805-43	TRANSISTOR 2SC3396	

The components identified by shading and mark **A** are critical for safety. Replace only with part number specified.

When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description	Remark	Ref.No	Part No.	Description	Remark
RESISTOR							
R201	1-216-049-00	METAL CHIP	1K 5% 1/10W	R254	1-216-067-00	METAL CHIP	5.6K 5% 1/10W
R202	1-216-029-00	METAL CHIP	150 5% 1/10W	R255	1-216-085-00	METAL CHIP	33K 5% 1/10W
R203	1-216-073-00	METAL CHIP	10K 5% 1/10W	R256	1-216-089-00	METAL CHIP	47K 5% 1/10W
R204	1-216-073-00	METAL CHIP	10K 5% 1/10W	R257	1-216-065-00	METAL CHIP	4.7K 5% 1/10W
R205	1-216-049-00	METAL CHIP	1K 5% 1/10W	R258	1-216-089-00	METAL CHIP	47K 5% 1/10W
R206	1-216-047-00	METAL CHIP	820 5% 1/10W	R259	1-216-063-00	METAL CHIP	3.9K 5% 1/10W
R207	1-216-073-00	METAL CHIP	10K 5% 1/10W	R260	1-216-053-00	METAL CHIP	1.5K 5% 1/10W
R208	1-216-075-00	METAL CHIP	12K 5% 1/10W	R261	1-216-053-00	METAL CHIP	1.5K 5% 1/10W
R209	1-216-041-00	METAL CHIP	470 5% 1/10W	R262	1-216-053-00	METAL CHIP	1.5K 5% 1/10W
R210	1-216-027-00	METAL CHIP	120 5% 1/10W	R263	1-216-053-00	METAL CHIP	1.5K 5% 1/10W
R211	1-216-035-00	METAL CHIP	270 5% 1/10W	R264	1-216-057-00	METAL CHIP	2.2K 5% 1/10W
R212	1-216-055-00	METAL CHIP	1.8K 5% 1/10W	R265	1-216-047-00	METAL CHIP	820 5% 1/10W
R213	1-216-053-00	METAL CHIP	1.5K 5% 1/10W	R266	1-216-069-00	METAL CHIP	6.8K 5% 1/10W
R214	1-216-071-00	METAL CHIP	8.2K 5% 1/10W	R267	1-216-049-00	METAL CHIP	1K 5% 1/10W
R215	1-216-041-00	METAL CHIP	470 5% 1/10W	R268	1-216-748-11	METAL CHIP	39K 5% 1/10W
R216	1-216-079-00	METAL CHIP	18K 5% 1/10W	R269	1-216-077-00	METAL CHIP	15K 5% 1/10W
R217	1-216-079-00	METAL CHIP	18K 5% 1/10W	R270	1-216-017-00	METAL CHIP	47 5% 1/10W
R218	1-216-049-00	METAL CHIP	1K 5% 1/10W	R271	1-216-059-00	METAL CHIP	2.7K 5% 1/10W
R219	1-216-039-00	METAL CHIP	390 5% 1/10W	R272	1-216-057-00	METAL CHIP	2.2K 5% 1/10W
R220	1-216-073-00	METAL CHIP	10K 5% 1/10W	R273	1-216-039-00	METAL CHIP	390 5% 1/10W
R221	1-216-073-00	METAL CHIP	10K 5% 1/10W	R274	1-216-035-00	METAL CHIP	270 5% 1/10W
R222	1-216-109-00	METAL CHIP	330K 5% 1/10W	R275	1-216-027-00	METAL CHIP	120 5% 1/10W
R223	1-216-081-00	METAL CHIP	22K 5% 1/10W	R276	1-216-027-00	METAL CHIP	120 5% 1/10W
R224	1-216-081-00	METAL CHIP	22K 5% 1/10W	R277	1-216-025-00	METAL CHIP	100 5% 1/10W
R227	1-216-041-00	METAL CHIP	470 5% 1/10W	R278	1-216-009-00	METAL CHIP	22 5% 1/10W
R228	1-216-041-00	METAL CHIP	470 5% 1/10W	R283	1-216-063-00	METAL CHIP	3.9K 5% 1/10W
R229	1-216-025-00	METAL CHIP	100 5% 1/10W	R284	1-216-031-00	METAL CHIP	180 5% 1/10W
R230	1-216-041-00	METAL CHIP	470 5% 1/10W	R285	1-216-047-00	METAL CHIP	820 5% 1/10W
R231	1-216-057-00	METAL CHIP	2.2K 5% 1/10W	R286	1-216-063-00	METAL CHIP	3.9K 5% 1/10W
R232	1-216-051-00	METAL CHIP	1.2K 5% 1/10W	R287	1-216-065-00	METAL CHIP	4.7K 5% 1/10W
R233	1-216-049-00	METAL CHIP	1K 5% 1/10W	R288	1-216-021-00	METAL CHIP	68 5% 1/10W
R234	1-216-079-00	METAL CHIP	18K 5% 1/10W	R289	1-216-138-00	METAL CHIP	3.3 5% 1/8W
R235	1-216-067-00	METAL CHIP	5.6K 5% 1/10W	R290	1-216-066-00	METAL CHIP	5.1K 5% 1/10W
R236	1-216-051-00	METAL CHIP	1.2K 5% 1/10W	R291	1-216-079-00	METAL CHIP	18K 5% 1/10W
R237	1-216-049-00	METAL CHIP	1K 5% 1/10W	R292	1-216-049-00	METAL CHIP	1K 5% 1/10W
R238	1-216-063-00	METAL CHIP	3.9K 5% 1/10W	R293	1-216-057-00	METAL CHIP	2.2K 5% 1/10W
R239	1-216-081-00	METAL CHIP	22K 5% 1/10W	R294	1-216-081-00	METAL CHIP	22K 5% 1/10W
R240	1-216-085-00	METAL CHIP	33K 5% 1/10W	R295	1-216-073-00	METAL CHIP	10K 5% 1/10W
R241	1-216-045-00	METAL CHIP	680 5% 1/10W	R296	1-216-047-00	METAL CHIP	820 5% 1/10W
R242	1-216-051-00	METAL CHIP	1.2K 5% 1/10W	R297	1-216-025-00	METAL CHIP	100 5% 1/10W
R243	1-216-051-00	METAL CHIP	1.2K 5% 1/10W	R298	1-216-049-00	METAL CHIP	1K 5% 1/10W
R244	1-216-049-00	METAL CHIP	1K 5% 1/10W	R299	1-216-049-00	METAL CHIP	1K 5% 1/10W
R245	1-216-057-00	METAL CHIP	2.2K 5% 1/10W	R300	1-216-069-00	METAL CHIP	6.8K 5% 1/10W
R246	1-216-073-00	METAL CHIP	10K 5% 1/10W	R301	1-216-047-00	METAL CHIP	820 5% 1/10W
R247	1-216-049-00	METAL CHIP	1K 5% 1/10W	R302	1-216-063-00	METAL CHIP	3.9K 5% 1/10W
R248	1-216-061-00	METAL CHIP	3.3K 5% 1/10W	R302	1-216-097-00	METAL CHIP	100K 5% 1/10W
R249	1-216-061-00	METAL CHIP	3.3K 5% 1/10W	R303	1-216-057-00	METAL CHIP	2.2K 5% 1/10W
R250	1-216-065-00	METAL CHIP	4.7K 5% 1/10W	R304	1-216-748-11	METAL CHIP	39K 5% 1/10W
R251	1-216-061-00	METAL CHIP	3.3K 5% 1/10W	R305	1-216-748-11	METAL CHIP	39K 5% 1/10W
R252	1-216-061-00	METAL CHIP	3.3K 5% 1/10W	R305	1-216-111-00	METAL CHIP	390K 5% 1/10W
R253	1-216-075-00	METAL CHIP	12K 5% 1/10W	R306	1-216-065-00	METAL CHIP	4.7K 5% 1/10W
				R307	1-216-065-00	METAL CHIP	4.7K 5% 1/10W
				R308	1-216-081-00	METAL CHIP	22K 5% 1/10W

When indicating parts by reference number, please include the board name.

MV-12

MR-8

RP-34

FP-49

RC-21

Ref.No	Part No.	Description	Remark
R308	1-216-748-11	METAL CHIP 39K 5% 1/10W	
R309	1-216-057-00	METAL CHIP 2.2K 5% 1/10W	
R311	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R312	1-216-061-00	METAL CHIP 3.3K 5% 1/10W	
R315	1-216-057-00	METAL CHIP 2.2K 5% 1/10W	
R651	1-216-025-00	METAL CHIP 100 5% 1/10W	
R652	1-216-033-00	METAL CHIP 220 5% 1/10W	
R653	1-216-069-00	METAL CHIP 6.8K 5% 1/10W	
R654	1-216-055-00	METAL CHIP 1.8K 5% 1/10W	
R655	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R656	1-216-093-00	METAL CHIP 68K 5% 1/10W	
R657	1-216-065-00	METAL CHIP 4.7K 5% 1/10W	
R658	1-216-065-00	METAL CHIP 4.7K 5% 1/10W	
R659	1-216-063-00	METAL CHIP 3.9K 5% 1/10W	
R660	1-216-063-00	METAL CHIP 3.9K 5% 1/10W	
R662	1-216-033-00	METAL CHIP 220 5% 1/10W	
R663	1-216-001-00	METAL CHIP 10 5% 1/10W	
<u>VARIABLE RESISTOR</u>			
RV201	1-230-869-11	RES, ADJ, METAL GLAZE 4.7K	
RV202	1-230-871-11	RES, ADJ, METAL GLAZE 22K	
RV203	1-230-868-11	RES, ADJ, METAL GLAZE 2.2K	
RV651	1-230-868-11	RES, ADJ, METAL GLAZE 2.2K	
RV652	1-230-867-11	RES, ADJ, METAL GLAZE 1K	
<u>SWITCH</u>			
S201	1-553-977-00	SWITCH, SLIDE	
<u>CRYSTAL</u>			
X201	1-567-347-11	OSCILLATOR, CERAMIC 13.3MHz	
*****			
*A-7060-948-A MR-8 BOARD, COMPLETE			
*****			
*A-7060-096-A RP-34 BOARD (HIC), COMPLETE			
<u>CAPASITOR</u>			
C101	1-163-117-00	CERAMIC CHIP 100PF 5% 50V	
C102	1-163-121-00	CERAMIC CHIP 150PF 5% 50V	
C103	1-163-117-00	CERAMIC CHIP 100PF 5% 50V	
C104	1-163-117-00	CERAMIC CHIP 100PF 5% 50V	
C105	1-163-038-00	CERAMIC CHIP 0.1MF 25V	
C108	1-124-222-00	ELECT 22MF 20% 6.3V	
C110	1-127-494-00	ELECT(SOLID) 3.3MF 20% 16V	
C111	1-163-035-00	CERAMIC CHIP 0.047MF 10% 25V	
C112	1-163-035-00	CERAMIC CHIP 0.047MF 10% 25V	
C151	1-163-035-00	CERAMIC CHIP 0.047MF 10% 25V	
<u>CONNECTOR</u>			
CN101	*1-564-016-00	PIN, CONNECTOR 6P	
CN102	*1-564-013-00	PIN, CONNECTOR 3P	
CN105	*1-564-003-00	PIN, CONNECTOR 4P	

Ref.No	Part No.	Description	Remark
<u>DIODE</u>			
D153	8-719-812-44	DIODE TLY124	
D154	8-719-812-41	DIODE TLR124	
<u>COIL</u>			
L101	1-408-777-00	INDUCTOR CHIP 10UH	
L102	1-408-948-00	MICRO INDUCTOR 220UH	
<u>TRANSISTOR</u>			
Q102	8-729-117-54	TRANSISTOR 2SA1175	
Q103	8-729-100-76	TRANSISTOR 2SA812	
Q151	8-729-805-69	TRANSISTOR 2SA1341	
<u>RESISTOR</u>			
R103	1-216-009-00	METAL CHIP 22 5% 1/10W	
R104	1-216-037-00	METAL CHIP 330 5% 1/10W	
R105	1-216-041-00	METAL CHIP 470 5% 1/10W	
R106	1-216-081-00	METAL CHIP 22K 5% 1/10W	
R107	1-216-085-00	METAL CHIP 33K 5% 1/10W	
R108	1-216-025-00	METAL CHIP 100 5% 1/10W	
R109	1-216-043-00	METAL CHIP 560 5% 1/10W	
R151	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R152	1-216-081-00	METAL CHIP 22K 5% 1/10W	
R153	1-216-093-00	METAL CHIP 68K 5% 1/10W	
R154	1-216-095-00	METAL CHIP 82K 5% 1/10W	
<u>VARIABLE RESISTOR</u>			
RV151	1-230-870-11	RES, ADJ, METAL GLAZE 10K	
RV152	1-230-875-21	RES, ADJ, METAL GLAZE 220K	
RV153	1-230-875-21	RES, ADJ, METAL GLAZE 220K	
RV155	1-230-875-21	RES, ADJ, METAL GLAZE 220K	
RV156	1-230-873-11	RES, ADJ, METAL GLAZE 47K	
<u>SWITCH</u>			
S101	1-554-364-00	SWITCH, SLIDE	
*****			
1-620-629-11 FP-49 FLEXIBLE BOARD			
*****			
1-537-005-21 JACK BOARD			
*****			
*A-7070-502-A RC-21 BOARD, COMPLETE			
*****			
<u>DIODE</u>			
D681	8-719-100-68	DIODE RD13EB2	
D682	8-719-100-68	DIODE RD13EB2	

When indicating parts by reference number, please include the board name.

RC-21

TA-50

FH-14

SS-70

Ref.No	Part No.	Description	Remark
<u>SWITCH</u>			
S681	1-570-689-11	SWITCH, KEY BOARD	
S682	1-553-977-41	SWITCH, SLIDE	
*****			
	*1-623-014-11	TA-50 BOARD	
		*****	
	1-566-607-11	PLUG (TERMINAL BOARD (A))	
*****			
	*1-623-018-21	FH-14 BOARD	
		*****	
<u>CAPACITOR</u>			
C681	1-123-321-00	ELECT 220MF 20% 16V	
<u>CONNECTOR</u>			
CN601	*1-564-002-00	PIN, CONNECTOR 3P	
<u>FUSE</u>			
PS901A	1-532-840-21	LINK, IC 1.25A	
PS902A	1-532-841-11	LINK, IC 1.6A	
PS903A	1-532-840-21	LINK, IC 1.25A	
*****			
	*A-7060-790-A	SS-70 BOARD, COMPLETE	
		*****	
	1-562-879-11	CONNECTOR, CARD EDGE 19P	
	1-562-880-11	CONNECTOR, CARD EDGE 15P	
	*3-674-372-00	HOLDER (A), LED	
	3-713-725-01	HOLDER, TOP END SENSOR	
<u>CAPACITOR</u>			
C301	1-135-099-00	TANTAL. CHIP 2.2MF 10% 6.3V	
C302	1-135-099-00	TANTAL. CHIP 2.2MF 10% 6.3V	
C303	1-163-033-00	CERAMIC CHIP 0.022MF 10% 25V	
C304	1-163-017-00	CERAMIC CHIP 0.0047MF 10% 50V	
C305	1-163-017-00	CERAMIC CHIP 0.0047MF 10% 50V	
C306	1-163-017-00	CERAMIC CHIP 0.0047MF 10% 50V	
C307	1-163-017-00	CERAMIC CHIP 0.0047MF 10% 50V	
C308	1-163-017-00	CERAMIC CHIP 0.0047MF 10% 50V	
C309	1-163-105-00	CERAMIC CHIP 33PF 5% 50V	
C310	1-163-105-00	CERAMIC CHIP 33PF 5% 50V	
C313	1-124-245-00	ELECT 4.7MF 20% 25V	
C314	1-123-617-00	ELECT 10MF 20% 16V	
C315	1-163-033-00	CERAMIC CHIP 0.022MF 10% 25V	
C316	1-163-033-00	CERAMIC CHIP 0.022MF 10% 25V	
C317	1-135-099-00	TANTAL. CHIP 2.2MF 10% 6.3V	
C318	1-163-017-00	CERAMIC CHIP 0.0047MF 10% 50V	
C319	1-135-104-00	TANTAL. CHIP 10MF 10% 4V	

Ref.No	Part No.	Description	Remark
C320	1-135-104-00	TANTAL. CHIP 10MF 10% 4V	
C321	1-163-013-00	CERAMIC CHIP 0.0022MF 10% 50V	
C322	1-163-013-00	CERAMIC CHIP 0.0022MF 10% 50V	
C323	1-163-077-00	CERAMIC CHIP 0.1MF 50V	
C324	1-163-077-00	CERAMIC CHIP 0.1MF 50V	
C325	1-135-100-21	TANTAL. CHIP 6.8MF 10% 6.3V	
C326	1-163-131-00	CERAMIC CHIP 390PF 5% 50V	
C327	1-135-099-00	TANTAL. CHIP 2.2MF 10% 6.3V	
C328	1-135-099-00	TANTAL. CHIP 2.2MF 10% 6.3V	
C329	1-163-038-00	CERAMIC CHIP 0.1MF 25V	
C501	1-124-257-00	ELECT 2.2MF 20% 50V	
C502	1-123-611-00	ELECT 1MF 20% 50V	
C503	1-163-021-00	CERAMIC CHIP 0.01MF 10% 50V	
C504	1-163-021-00	CERAMIC CHIP 0.01MF 10% 50V	
C505	1-163-020-00	CERAMIC CHIP 0.0082MF 10% 50V	
C506	1-163-021-00	CERAMIC CHIP 0.01MF 10% 50V	
C507	1-163-075-00	CERAMIC CHIP 0.047MF 10% 25V	
C508	1-124-577-11	ELECT 82MF 20% 10V	
C509	1-163-209-00	CERAMIC CHIP 0.0015MF 5% 50V	
C510	1-163-209-00	CERAMIC CHIP 0.0015MF 5% 50V	
C511	1-163-017-00	CERAMIC CHIP 0.0047MF 10% 50V	
C512	1-163-017-00	CERAMIC CHIP 0.0047MF 10% 50V	
C513	1-163-077-00	CERAMIC CHIP 0.1MF 50V	
C514	1-124-499-11	ELECT 1MF 20% 50V	
C515	1-124-287-00	ELECT 10MF 20% 10V	
C516	1-163-033-00	CERAMIC CHIP 0.022MF 10% 25V	
C517	1-163-033-00	CERAMIC CHIP 0.022MF 10% 25V	
C518	1-163-021-00	CERAMIC CHIP 0.01MF 10% 50V	
C519	1-124-270-11	ELECT 0.47MF 20% 50V	
C520	1-163-211-00	CERAMIC CHIP 0.0018MF 5% 50V	
C521	1-163-021-00	CERAMIC CHIP 0.01MF 10% 50V	
C522	1-123-617-00	ELECT 10MF 20% 16V	
C523	1-124-499-11	ELECT 1MF 20% 50V	
C524	1-163-059-00	CERAMIC CHIP 0.01MF 10% 50V	
C525	1-163-075-00	CERAMIC CHIP 0.047MF 10% 25V	
C526	1-163-033-00	CERAMIC CHIP 0.022MF 10% 25V	
C527	1-163-075-00	CERAMIC CHIP 0.047MF 10% 25V	
C528	1-163-021-00	CERAMIC CHIP 0.01MF 10% 50V	
C529	1-124-638-11	ELECT 22MF 20% 10V	
C530	1-163-033-00	CERAMIC CHIP 0.022MF 10% 25V	
C531	1-163-075-00	CERAMIC CHIP 0.047MF 10% 25V	
C532	1-163-145-00	CERAMIC CHIP 0.0015MF 5% 50V	
C533	1-163-139-00	CERAMIC CHIP 820PF 5% 50V	
C534	1-163-033-00	CERAMIC CHIP 0.022MF 10% 25V	
C535	1-127-487-00	ELECT(SOLID) 4.7MF 20% 10V	
C536	1-163-035-00	CERAMIC CHIP 0.047MF 10% 25V	
C538	1-163-131-00	CERAMIC CHIP 390PF 5% 50V	
C539	1-124-255-00	ELECT 1MF 20% 50V	
C540	1-124-255-00	ELECT 1MF 20% 50V	
C541	1-124-255-00	ELECT 1MF 20% 50V	
C542	1-124-258-00	ELECT 3.3MF 20% 25V	
C543	1-163-035-00	CERAMIC CHIP 0.047MF 10% 25V	
C544	1-163-035-00	CERAMIC CHIP 0.047MF 10% 25V	

The components identified by shading and mark  $\Delta$  are critical for safety. Replace only with part number specified.

When indicating parts by reference number, please include the board name.



Ref.No	Part No.	Description	Remark	Ref.No	Part No.	Description	Remark
C545	1-124-462-00	ELECT 10MF 20%	16V	D506	8-719-200-36	DIODE E10QS04	
C546	1-124-462-00	ELECT 10MF 20%	16V			<u>FILTER</u>	
C547	1-124-462-00	ELECT 10MF 20%	16V	FL501	1-235-612-21	BPF 16KHz	
C548	1-163-133-00	CERAMIC CHIP 470PF 5%	50V	FL502	1-235-611-21	BPF 47KHz	
C549	1-163-021-00	CERAMIC CHIP 0.01MF 10%	50V			<u>IC</u>	
C550	1-127-506-00	ELECT(SOLID) 1MF 20%	25V	IC301	8-759-970-70	IC MB88551-274	
C551	1-163-021-00	CERAMIC CHIP 0.01MF 10%	50V	IC302	8-759-100-95	IC UPC324G2	
C553	1-126-099-11	ELECT 2.2MF 20%	35V	IC303	8-759-922-54	IC S-81250AG	
C554	1-124-236-00	ELECT 47MF 20%	16V	IC304	8-759-937-56	IC S-8054ALB-LM-TS	
C556	1-124-499-11	ELECT 1MF 20%	50V	IC305	8-759-207-00	IC TA7733F	
C557	1-163-017-00	CERAMIC CHIP 0.0047MF 10%	50V	IC501	8-759-107-68	IC CX20115A	
C558	1-124-596-11	ELECT 27MF 20%	16V	IC502	8-759-201-80	IC TC4526BF	
C559	1-124-596-11	ELECT 27MF 20%	16V	IC503	8-752-003-50	IC CX20035	
C560	1-124-596-11	ELECT 27MF 20%	16V	IC504	8-759-925-66	IC BA6303F	
C561	1-123-617-00	ELECT 10MF 20%	16V	IC505	8-759-701-36	IC NJM3403AM	
C562	1-163-038-00	CERAMIC CHIP 0.1MF 25V		IC506	8-759-300-72	IC HD14066BFP	
C563	1-163-017-00	CERAMIC CHIP 0.0047MF 10%	50V	IC507	8-759-928-56	IC CXA1042M	
C564	1-124-577-11	ELECT 82MF 20%	10V	IC508	8-752-003-60	IC CX20036	
C565	1-124-577-11	ELECT 82MF 20%	10V	IC509	8-759-202-45	IC CX20114	
C566	1-163-077-00	CERAMIC CHIP 0.1MF 50V		IC510	8-759-803-47	IC LA5005M	
C567	1-124-577-11	ELECT 82MF 20%	10V			<u>COIL</u>	
C568	1-123-617-00	ELECT 10MF 20%	16V	L301	1-407-177-XX	MICRO INDUCTOR 470UH	
C569	1-163-035-00	CERAMIC CHIP 0.047MF 10%	25V	L502	1-408-948-00	MICRO INDUCTOR 220UH	
C570	1-163-109-00	CERAMIC CHIP 47PF 5%	50V	L503	1-410-627-11	COIL, CHOKE 100UH	
C571	1-163-133-00	CERAMIC CHIP 470PF 5%	50V	L504	1-410-628-11	COIL, CHOKE 200UH	
C572	1-163-021-00	CERAMIC CHIP 0.01MF 10%	50V	L505	1-410-628-11	COIL, CHOKE 200UH	
C573	1-135-096-21	TANTAL. CHIP 4.7MF 20%	10V	L505	1-410-628-11	COIL, CHOKE 200UH	
C574	1-163-038-00	CERAMIC CHIP 0.1MF 25V		L506	1-408-987-21	MICRO INDUCTOR 330UH	
C575	1-163-038-00	CERAMIC CHIP 0.1MF 25V				<u>IC LINK</u>	
C576	1-163-038-00	CERAMIC CHIP 0.1MF 25V		PS301A	1-532-685-00	LINK, IC ICP-N20 0.8A	
C577	1-135-096-21	TANTAL. CHIP 4.7MF 20%	10V	PS501A	1-532-637-00	LINK, IC ICP-N25 1.0A	
		<u>CONNECTOR</u>				<u>TRANSISTOR</u>	
CN303	*1-506-979-21	CONNECTOR, BOARD TO BOARD 13P		Q301	8-729-100-76	TRANSISTOR 2SA812	
CN304	*1-563-612-11	CONNECTOR, FLEXIBLE 9P		Q302	8-729-100-76	TRANSISTOR 2SA812	
CN305	*1-564-016-00	PIN, CONNECTOR 6P		Q303	8-729-100-76	TRANSISTOR 2SA812	
CN306	*1-506-979-21	CONNECTOR, BOARD TO BOARD 13P		Q306	8-729-903-10	TRANSISTOR FMW1	
CN307	*1-564-013-00	PIN, CONNECTOR 3P		Q307	8-729-805-45	TRANSISTOR 2SC3395	
CN501	*1-564-014-00	PIN, CONNECTOR 4P		Q308	8-729-100-76	TRANSISTOR 2SA812	
CN502	*1-564-014-00	PIN, CONNECTOR 4P		Q309	8-729-901-47	TRANSISTOR DTA143EK	
CN504	*1-564-014-00	PIN, CONNECTOR 4P		Q310	8-729-805-41	TRANSISTOR 2SC3398	
CN505	*1-564-015-00	PIN, CONNECTOR 5P		Q311	8-729-901-07	TRANSISTOR DTA124XK	
		<u>DIODE</u>		Q312	8-729-100-67	TRANSISTOR 2SC1623-L7	
D301	8-719-951-12	DIODE HZ5BLL		Q313	8-729-902-96	TRANSISTOR FMS1	
D302	8-719-100-05	DIODE 1S2837		Q314	8-729-903-82	TRANSISTOR FMW2	
D305	8-719-100-03	DIODE 1S2835		Q315	8-729-104-95	TRANSISTOR 2SB1040A-5	
D308	8-719-100-05	DIODE 1S2837		Q316	8-729-100-67	TRANSISTOR 2SC1623-L7	
D309	8-719-100-05	DIODE 1S2837		Q317	8-729-805-69	TRANSISTOR 2SA1341	
D502	8-719-101-23	DIODE 1SS123					
D503	8-719-200-27	DIODE E100S2					
D504	8-719-000-12	DIODE MC931					
D505	8-719-200-36	DIODE E10QS04					

The components identified by shading and mark **A** are critical for safety. Replace only with part number specified.

When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description	Remark	Ref.No	Part No.	Description	Remark
Q318	8-729-904-20	TRANSISTOR FMA2		R313	1-216-081-00	METAL CHIP 22K 5%	1/10W
Q319	8-729-805-25	TRANSISTOR 2SB1121		R314	1-216-081-00	METAL CHIP 22K 5%	1/10W
Q320	8-729-805-25	TRANSISTOR 2SB1121		R315	1-216-081-00	METAL CHIP 22K 5%	1/10W
Q321	8-729-904-20	TRANSISTOR FMA2		R316	1-216-071-00	METAL CHIP 8.2K 5%	1/10W
Q322	8-729-805-69	TRANSISTOR 2SA1341		R317	1-216-091-00	METAL CHIP 56K 5%	1/10W
Q323	8-729-903-10	TRANSISTOR FMW1		R318	1-216-089-00	METAL CHIP 47K 5%	1/10W
Q324	8-729-805-45	TRANSISTOR 2SC3395		R319	1-216-099-00	METAL CHIP 120K 5%	1/10W
Q325	8-729-901-21	TRANSISTOR 2SC3395		R320	1-216-097-00	METAL CHIP 100K 5%	1/10W
Q326	8-729-700-10	NJL7141E-S		R321	1-216-097-00	METAL CHIP 100K 5%	1/10W
Q327	8-729-700-10	NJL7141E-S		R322	1-216-043-00	METAL CHIP 560 5%	1/10W
Q328	8-729-805-41	TRANSISTOR 2SC3398		R323	1-216-097-00	METAL CHIP 100K 5%	1/10W
Q501	8-729-901-01	TRANSISTOR DTC144EK		R324	1-216-097-00	METAL CHIP 100K 5%	1/10W
Q502	8-729-100-76	TRANSISTOR 2SA812		R325	1-216-097-00	METAL CHIP 100K 5%	1/10W
Q503	8-729-100-67	TRANSISTOR 2SC1623-L7		R326	1-216-113-00	METAL CHIP 470K 5%	1/10W
Q504	8-729-904-20	TRANSISTOR FMA2		R327	1-216-113-00	METAL CHIP 470K 5%	1/10W
Q505	8-729-100-76	TRANSISTOR 2SA812		R328	1-216-085-00	METAL CHIP 33K 5%	1/10W
Q506	8-729-805-45	TRANSISTOR 2SC3395		R329	1-216-073-00	METAL CHIP 10K 5%	1/10W
Q507	8-729-805-69	TRANSISTOR 2SA1341		R330	1-216-105-00	METAL CHIP 220K 5%	1/10W
Q508	8-729-100-67	TRANSISTOR 2SC1623-L7		R331	1-216-097-00	METAL CHIP 100K 5%	1/10W
Q509	8-729-100-76	TRANSISTOR 2SA812		R332	1-216-105-00	METAL CHIP 220K 5%	1/10W
Q510	8-729-100-67	TRANSISTOR 2SC1623-L7		R333	1-216-097-00	METAL CHIP 100K 5%	1/10W
Q511	8-729-100-76	TRANSISTOR 2SA812		R334	1-216-109-00	METAL CHIP 330K 5%	1/10W
Q512	8-729-100-76	TRANSISTOR 2SA812		R335	1-216-121-00	METAL CHIP 1M 5%	1/10W
Q513	8-729-904-20	TRANSISTOR FMA2		R336	1-216-097-00	METAL CHIP 100K 5%	1/10W
Q514	8-729-805-69	TRANSISTOR 2SA1341		R337	1-216-097-00	METAL CHIP 100K 5%	1/10W
Q515	8-729-904-20	TRANSISTOR FMA2		R338	1-216-089-00	METAL CHIP 47K 5%	1/10W
Q516	8-729-100-66	TRANSISTOR 2SC1623		R339	1-216-097-00	METAL CHIP 100K 5%	1/10W
Q517	8-729-100-76	TRANSISTOR 2SA812		R340	1-216-172-00	METAL CHIP 82 5%	1/8W
Q518	8-729-100-66	TRANSISTOR 2SC1623		R341	1-216-097-00	METAL CHIP 100K 5%	1/10W
Q519	8-729-100-76	TRANSISTOR 2SA812		R342	1-216-057-00	METAL CHIP 2.2K 5%	1/10W
Q520	8-729-100-66	TRANSISTOR 2SC1623		R343	1-216-073-00	METAL CHIP 10K 5%	1/10W
Q521	8-729-100-76	TRANSISTOR 2SA812		R344	1-216-073-00	METAL CHIP 10K 5%	1/10W
Q522	8-729-903-29	TRANSISTOR DTA144TK		R345	1-216-097-00	METAL CHIP 100K 5%	1/10W
Q524	8-729-805-25	TRANSISTOR 2SB1121		R346	1-216-097-00	METAL CHIP 100K 5%	1/10W
Q525	8-729-805-25	TRANSISTOR 2SB1121		R347	1-216-073-00	METAL CHIP 10K 5%	1/10W
Q526	8-729-803-37	TRANSISTOR 2SA1237		R348	1-216-073-00	METAL CHIP 10K 5%	1/10W
Q527	8-729-100-67	TRANSISTOR 2SC1623-L7		R349	1-216-073-00	METAL CHIP 10K 5%	1/10W
Q528	8-729-903-30	TRANSISTOR DTC144TK		R350	1-216-097-00	METAL CHIP 100K 5%	1/10W
Q529	8-729-903-29	TRANSISTOR DTA144TK		R351	1-216-073-00	METAL CHIP 10K 5%	1/10W
Q530	8-729-162-44	TRANSISTOR 2SB624-BV4		R352	1-216-089-00	METAL CHIP 47K 5%	1/10W
Q531	8-729-805-45	TRANSISTOR 2SC3395		R353	1-216-051-00	METAL CHIP 1.2K 5%	1/10W
Q532	8-729-901-01	TRANSISTOR DTC144EK		R354	1-216-051-00	METAL CHIP 1.2K 5%	1/10W
<u>RESISTOR</u>				R355	1-216-089-00	METAL CHIP 47K 5%	1/10W
R301	1-216-063-00	METAL CHIP 3.9K 5%	1/10W	R356	1-216-196-00	METAL CHIP 820 5%	1/8W
R303	1-216-111-00	METAL CHIP 390K 5%	1/10W	R357	1-216-196-00	METAL CHIP 820 5%	1/8W
R304	1-216-111-00	METAL CHIP 390K 5%	1/10W	R358	1-216-097-00	METAL CHIP 100K 5%	1/10W
R306	1-216-111-00	METAL CHIP 390K 5%	1/10W	R359	1-216-077-00	METAL CHIP 15K 5%	1/10W
R307	1-216-748-11	METAL CHIP 39K 5%	1/10W	R360	1-216-097-00	METAL CHIP 100K 5%	1/10W
R309	1-216-748-11	METAL CHIP 39K 5%	1/10W	R361	1-216-083-00	METAL CHIP 27K 5%	1/10W
R310	1-216-748-11	METAL CHIP 39K 5%	1/10W	R362	1-216-109-00	METAL CHIP 330K 5%	1/10W
R311	1-216-121-00	METAL CHIP 1M 5%	1/10W	R363	1-216-077-00	METAL CHIP 15K 5%	1/10W
R312	1-216-121-00	METAL CHIP 1M 5%	1/10W	R364	1-216-083-00	METAL CHIP 27K 5%	1/10W
				R365	1-216-121-00	METAL CHIP 1M 5%	1/10W

When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description	Remark			Ref.No	Part No.	Description	Remark		
R366	1-216-049-00	METAL CHIP	1K	5%	1/10W	R521	1-216-091-00	METAL CHIP	56K	5%	1/10W
R367	1-216-194-00	METAL CHIP	680	5%	1/8W	R522	1-216-075-00	METAL CHIP	12K	5%	1/10W
R368	1-216-049-00	METAL CHIP	1K	5%	1/10W	R523	1-216-115-00	METAL CHIP	560K	5%	1/10W
R369	1-216-073-00	METAL CHIP	10K	5%	1/10W	R524	1-216-113-00	METAL CHIP	470K	5%	1/10W
R370	1-216-073-00	METAL CHIP	10K	5%	1/10W	R525	1-216-055-00	METAL CHIP	1.8K	5%	1/10W
R371	1-216-073-00	METAL CHIP	10K	5%	1/10W	R526	1-216-043-00	METAL CHIP	560	5%	1/10W
R372	1-216-073-00	METAL CHIP	10K	5%	1/10W	R527	1-216-107-00	METAL CHIP	270K	5%	1/10W
R373	1-216-194-00	METAL CHIP	680	5%	1/8W	R529	1-216-115-00	METAL CHIP	560K	5%	1/10W
R374	1-216-194-00	METAL CHIP	680	5%	1/8W	R530	1-216-107-00	METAL CHIP	270K	5%	1/10W
R375	1-216-097-00	METAL CHIP	100K	5%	1/10W	R531	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R376	1-216-097-00	METAL CHIP	100K	5%	1/10W	R532	1-216-089-00	METAL CHIP	47K	5%	1/10W
R377	1-216-196-00	METAL CHIP	820	5%	1/8W	R533	1-216-099-00	METAL CHIP	120K	5%	1/10W
R378	1-216-089-00	METAL CHIP	47K	5%	1/10W	R534	1-216-083-00	METAL CHIP	27K	5%	1/10W
R379	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	R535	1-216-075-00	METAL CHIP	12K	5%	1/10W
R380	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	R537	1-216-075-00	METAL CHIP	12K	5%	1/10W
R381	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	R538	1-216-073-00	METAL CHIP	10K	5%	1/10W
R382	1-216-085-00	METAL CHIP	33K	5%	1/10W	R539	1-216-091-00	METAL CHIP	56K	5%	1/10W
R383	1-216-166-00	METAL CHIP	47	5%	1/8W	R540	1-216-091-00	METAL CHIP	56K	5%	1/10W
R384	1-216-079-00	METAL CHIP	18K	5%	1/10W	R541	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R385	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	R542	1-216-049-00	METAL CHIP	1K	5%	1/10W
R386	1-216-097-00	METAL CHIP	100K	5%	1/10W	R543	1-216-047-00	METAL CHIP	820	5%	1/10W
R387	1-216-097-00	METAL CHIP	100K	5%	1/10W	R544	1-216-039-00	METAL CHIP	390	5%	1/10W
R389	1-216-097-00	METAL CHIP	100K	5%	1/10W	R546	1-216-051-00	METAL CHIP	1.2K	5%	1/10W
R390	1-216-097-00	METAL CHIP	100K	5%	1/10W	R548	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R391	1-216-073-00	METAL CHIP	10K	5%	1/10W	R549	1-216-083-00	METAL CHIP	27K	5%	1/10W
R392	1-216-089-00	METAL CHIP	47K	5%	1/10W	R550	1-216-081-00	METAL CHIP	22K	5%	1/10W
R393	1-216-089-00	METAL CHIP	47K	5%	1/10W	R551	1-216-085-00	METAL CHIP	33K	5%	1/10W
R394	1-216-089-00	METAL CHIP	47K	5%	1/10W	R552	1-216-748-11	METAL CHIP	39K	5%	1/10W
R395	1-216-089-00	METAL CHIP	47K	5%	1/10W	R553	1-216-049-00	METAL CHIP	1K	5%	1/10W
R396	1-216-085-00	METAL CHIP	33K	5%	1/10W	R554	1-216-089-00	METAL CHIP	47K	5%	1/10W
R397	1-216-089-00	METAL CHIP	47K	5%	1/10W	R555	1-216-091-00	METAL CHIP	56K	5%	1/10W
R398	1-216-107-00	METAL CHIP	270K	5%	1/10W	R556	1-216-085-00	METAL CHIP	33K	5%	1/10W
R399	1-216-049-00	METAL CHIP	1K	5%	1/10W	R557	1-216-103-00	METAL CHIP	180K	5%	1/10W
R501	1-216-097-00	METAL CHIP	100K	5%	1/10W	R558	1-216-097-00	METAL CHIP	100K	5%	1/10W
R502	1-216-081-00	METAL CHIP	22K	5%	1/10W	R559	1-216-081-00	METAL CHIP	22K	5%	1/10W
R503	1-216-113-00	METAL CHIP	470K	5%	1/10W	R560	1-216-115-00	METAL CHIP	560K	5%	1/10W
R504	1-216-075-00	METAL CHIP	12K	5%	1/10W	R561	1-216-117-00	METAL CHIP	680K	5%	1/10W
R505	1-216-099-00	METAL CHIP	120K	5%	1/10W	R562	1-216-073-00	METAL CHIP	10K	5%	1/10W
R506	1-216-109-00	METAL CHIP	330K	5%	1/10W	R563	1-216-091-00	METAL CHIP	56K	5%	1/10W
R507	1-216-069-00	METAL CHIP	6.8K	5%	1/10W	R564	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R508	1-216-089-00	METAL CHIP	47K	5%	1/10W	R565	1-216-075-00	METAL CHIP	12K	5%	1/10W
R509	1-216-073-00	METAL CHIP	10K	5%	1/10W	R569	1-216-049-00	METAL CHIP	1K	5%	1/10W
R510	1-216-117-00	METAL CHIP	680K	5%	1/10W	R570	1-216-075-00	METAL CHIP	12K	5%	1/10W
R511	1-216-065-00	METAL CHIP	4.7K	5%	1/10W	R571	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R512	1-216-053-00	METAL CHIP	1.5K	5%	1/10W	R572	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R513	1-216-113-00	METAL CHIP	470K	5%	1/10W	R573	1-216-099-00	METAL CHIP	120K	5%	1/10W
R514	1-216-073-00	METAL CHIP	10K	5%	1/10W	R574	1-216-097-00	METAL CHIP	100K	5%	1/10W
R515	1-216-073-00	METAL CHIP	10K	5%	1/10W	R575	1-216-077-00	METAL CHIP	15K	5%	1/10W
R516	1-216-073-00	METAL CHIP	10K	5%	1/10W	R576	1-216-101-00	METAL CHIP	150K	5%	1/10W
R517	1-216-085-00	METAL CHIP	33K	5%	1/10W	R577	1-216-041-00	METAL CHIP	470	5%	1/10W
R518	1-216-073-00	METAL CHIP	10K	5%	1/10W	R578	1-216-067-00	METAL CHIP	5.6K	5%	1/10W
R519	1-216-081-00	METAL CHIP	22K	5%	1/10W	R579	1-216-089-00	METAL CHIP	47K	5%	1/10W
R520	1-216-117-00	METAL CHIP	680K	5%	1/10W	R580	1-216-089-00	METAL CHIP	47K	5%	1/10W

When indicating parts by reference number, please include the board name.

**SS-70****AU-31**

Ref.No	Part No.	Description	Remark			Ref.No	Part No.	Description	Remark		
R581	1-216-025-00	METAL CHIP	100	5%	1/10W	R643	1-216-089-00	METAL CHIP	47K	5%	1/10W
R582	1-216-077-00	METAL CHIP	15K	5%	1/10W	R644	1-216-270-00	METAL CHIP	1M	5%	1/8W
R583	1-216-748-11	METAL CHIP	39K	5%	1/10W	R645	1-216-073-00	METAL CHIP	10K	5%	1/10W
R584	1-216-073-00	METAL CHIP	10K	5%	1/10W	R646	1-216-073-00	METAL CHIP	10K	5%	1/10W
R585	1-216-049-00	METAL CHIP	1K	5%	1/10W	R647	1-216-073-00	METAL CHIP	10K	5%	1/10W
R586	1-216-047-00	METAL CHIP	820	5%	1/10W	R648	1-216-073-00	METAL CHIP	10K	5%	1/10W
R587	1-216-115-00	METAL CHIP	560K	5%	1/10W	R649	1-216-073-00	METAL CHIP	10K	5%	1/10W
R589	1-216-073-00	METAL CHIP	10K	5%	1/10W	VARIABLE RESISTOR					
R590	1-216-049-00	METAL CHIP	1K	5%	1/10W	RV502	1-230-873-11	RES, ADJ, METAL GLAZE 47K			
R591	1-216-099-00	METAL CHIP	120K	5%	1/10W	JUMPER WIRE					
R592	1-216-067-00	METAL CHIP	5.6K	5%	1/10W	W301	1-535-639-11	WIRE, JUMPER (10 CORE)			
R593	1-216-121-00	METAL CHIP	1M	5%	1/10W	CRYSTAL					
R594	1-216-059-00	METAL CHIP	2.7K	5%	1/10W	X301	1-567-143-00	OSCILLATOR, CERAMIC 6MHz			
R595	1-216-049-00	METAL CHIP	1K	5%	1/10W	*****					
R596	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	*A-7060-771-A AU-31 BOARD, COMPLETE					
R597	1-216-077-00	METAL CHIP	15K	5%	1/10W	*****					
R598	1-216-077-00	METAL CHIP	15K	5%	1/10W	CAPACITOR					
R599	1-216-049-00	METAL CHIP	1K	5%	1/10W	C401	1-163-141-00	CERAMIC CHIP	0.001MF	10%	50V
R600	1-214-972-00	METAL	0.22	5%	1/4W	C402	1-135-083-00	TANTAL. CHIP	0.47MF	20%	25V
R601	1-216-061-00	METAL CHIP	3.3K	5%	1/10W	C403	1-163-133-00	CERAMIC CHIP	470PF	5%	50V
R602	1-216-304-11	METAL CHIP	3.3	5%	1/10W	C404	1-124-255-00	ELECT	1MF	20%	50V
R603	1-216-304-11	METAL CHIP	3.3	5%	1/10W	C405	1-135-070-00	TANTAL. CHIP	0.1MF	20%	35V
R604	1-216-304-11	METAL CHIP	3.3	5%	1/10W	C406	1-124-229-00	ELECT	33MF	20%	6.3V
R605	1-216-121-00	METAL CHIP	1M	5%	1/10W	C407	1-163-145-00	CERAMIC CHIP	0.0015MF	10%	50V
R606	1-216-073-00	METAL CHIP	10K	5%	1/10W	C408	1-163-123-00	CERAMIC CHIP	180PF	5%	50V
R607	1-216-097-00	METAL CHIP	100K	5%	1/10W	C409	1-163-017-00	CERAMIC CHIP	0.0047MF	10%	50V
R608	1-216-115-00	METAL CHIP	560K	5%	1/10W	C410	1-163-014-00	CERAMIC CHIP	0.0027MF	10%	50V
R609	1-216-097-00	METAL CHIP	100K	5%	1/10W	C411	1-135-099-00	TANTAL. CHIP	2.2MF	20%	6.3V
R610	1-216-041-00	METAL CHIP	470	5%	1/10W	C412	1-135-104-00	TANTAL. CHIP	10MF	20%	4V
R611	1-216-041-00	METAL CHIP	470	5%	1/10W	C413	1-163-020-00	CERAMIC CHIP	0.0082MF	10%	50V
R612	1-216-025-00	METAL CHIP	100	5%	1/10W	C414	1-163-137-00	CERAMIC CHIP	680PF	5%	50V
R613	1-216-115-00	METAL CHIP	560K	5%	1/10W	C415	1-135-104-00	TANTAL. CHIP	10MF	20%	4V
R614	1-216-115-00	METAL CHIP	560K	5%	1/10W	C416	1-135-091-00	TANTAL. CHIP	1MF	20%	16V
R615	1-216-091-00	METAL CHIP	56K	5%	1/10W	C417	1-163-125-00	CERAMIC CHIP	220PF	10%	50V
R617	1-216-073-00	METAL CHIP	10K	5%	1/10W	C418	1-162-587-91	CERAMIC CHIP	0.039MF	10%	25V
R618	1-216-065-00	METAL CHIP	4.7K	5%	1/10W	C419	1-163-088-00	CERAMIC CHIP	5PF	0.25PF	50V
R620	1-216-065-00	METAL CHIP	4.7K	5%	1/10W	C420	1-163-017-00	CERAMIC CHIP	0.0047MF	10%	50V
R621	1-216-214-00	METAL CHIP	4.7K	5%	1/8W	C421	1-135-104-00	TANTAL. CHIP	10MF	20%	4V
R622	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	C423	1-163-021-00	CERAMIC CHIP	0.01MF	10%	50V
R623	1-216-061-00	METAL CHIP	3.3K	5%	1/10W	C424	1-124-225-00	ELECT	100MF	20%	6.3V
R624	1-216-055-00	METAL CHIP	1.8K	5%	1/10W	C425	1-124-225-00	ELECT	100MF	20%	6.3V
R629	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	C426	1-124-225-00	ELECT	100MF	20%	6.3V
R630	1-216-097-00	METAL CHIP	100K	5%	1/10W	C427	1-163-019-00	CERAMIC CHIP	0.0068MF	10%	50V
R633	1-216-025-00	METAL CHIP	100	5%	1/10W	C428	1-163-021-00	CERAMIC CHIP	0.01MF	10%	50V
R634	1-216-073-00	METAL CHIP	10K	5%	1/10W	C429	1-163-021-00	CERAMIC CHIP	0.01MF	10%	50V
R635	1-216-073-00	METAL CHIP	10K	5%	1/10W	C430	1-163-123-00	CERAMIC CHIP	180PF	5%	50V
R636	1-216-073-00	METAL CHIP	10K	5%	1/10W	C431	1-163-033-00	CERAMIC CHIP	0.022MF	10%	25V
R637	1-216-073-00	METAL CHIP	10K	5%	1/10W						
R638	1-216-073-00	METAL CHIP	10K	5%	1/10W						
R639	1-216-073-00	METAL CHIP	10K	5%	1/10W						
R640	1-216-073-00	METAL CHIP	10K	5%	1/10W						
R641	1-216-073-00	METAL CHIP	10K	5%	1/10W						
R642	1-216-073-00	METAL CHIP	10K	5%	1/10W						

When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description	Remark	Ref.No	Part No.	Description	Remark
C432	1-135-083-00	TANTAL. CHIP 0.47MF	20% 25V	R429	1-216-071-00	METAL CHIP 8.2K 5%	1/10W
C433	1-163-121-00	CERAMIC CHIP 150PF	5% 50V	R430	1-216-085-00	METAL CHIP 33K 5%	1/10W
C434	1-163-014-00	CERAMIC CHIP 0.0027MF	10% 50V	R431	1-216-085-00	METAL CHIP 33K 5%	1/10W
C435	1-163-021-00	CERAMIC CHIP 0.01MF	10% 50V	R432	1-216-069-00	METAL CHIP 6.8K 5%	1/10W
C436	1-135-104-00	TANTAL. CHIP 10MF	20% 4V	R433	1-216-065-00	METAL CHIP 4.7K 5%	1/10W
C437	1-163-133-00	CERAMIC CHIP 470PF	10% 50V	R434	1-216-071-00	METAL CHIP 8.2K 5%	1/10W
C438	1-135-104-00	TANTAL. CHIP 10MF	20% 4V	R435	1-216-065-00	METAL CHIP 4.7K 5%	1/10W
C439	1-163-117-00	CERAMIC CHIP 100PF	5% 50V	R436	1-216-041-00	METAL CHIP 470 5%	1/10W
C440	1-135-104-00	TANTAL. CHIP 10MF	20% 4V	R437	1-216-043-00	METAL CHIP 560 5%	1/10W
<u>FILTER</u>				R438	1-216-025-00	METAL CHIP 100 5%	1/10W
FL401	1-235-398-11	BPF 1.5MHz		R439	1-216-081-00	METAL CHIP 22K 5%	1/10W
<u>IC</u>				R440	1-216-055-00	METAL CHIP 1.8K 5%	1/10W
IC401	8-752-003-79	IC CX20037A		<u>VARIABLE RESISTOR</u>			
<u>COIL</u>				RV401	1-230-870-11	RES, ADJ, METAL GLAZE 10K	
L401	1-408-793-21	INDUCTOR CHIP 220UH		RV402	1-230-871-11	RES, ADJ, METAL GLAZE 22K	
<u>TRANSISTOR</u>				*****			
Q403	8-729-100-67	TRANSISTOR 2SC1623-L7		1-623-007-11	SK-19 FLEXIBLE BOARD		
Q404	8-729-100-67	TRANSISTOR 2SC1623-L7		*****			
Q405	8-729-100-76	TRANSISTOR 2SA812		<u>RESISTOR</u>			
Q406	8-729-100-67	TRANSISTOR 2SC1623-L7		R001	1-216-296-00	METAL CHIP 0 5%	1/8W
<u>RESISTOR</u>				R002	1-216-296-00	METAL CHIP 0 5%	1/8W
R401	1-216-085-00	METAL CHIP 33K 5%	1/10W	<u>SWITCH</u>			
R402	1-216-069-00	METAL CHIP 6.8K 5%	1/10W	S351	1-570-773-21	SWITCH, SLIDER	
R403	1-216-069-00	METAL CHIP 6.8K 5%	1/10W	S352	1-554-371-31	SWITCH, TACT	
R404	1-216-069-00	METAL CHIP 6.8K 5%	1/10W	S353	1-554-371-31	SWITCH, TACT	
R405	1-216-073-00	METAL CHIP 10K 5%	1/10W	S354	1-554-371-31	SWITCH, TACT	
R406	1-216-059-00	METAL CHIP 2.7K 5%	1/10W	S355	1-554-371-31	SWITCH, TACT	
R407	1-216-061-00	METAL CHIP 3.3K 5%	1/10W	S356	1-554-371-31	SWITCH, TACT	
R408	1-216-061-00	METAL CHIP 3.3K 5%	1/10W	*****			
R409	1-216-059-00	METAL CHIP 2.7K 5%	1/10W	*A-7070-494-A	MA-21 BOARD, COMPLETE		
R410	1-216-057-00	METAL CHIP 2.2K 5%	1/10W	*****			
R411	1-216-045-00	METAL CHIP 680 5%	1/10W	<u>CAPACITOR</u>			
R412	1-216-063-00	METAL CHIP 3.9K 5%	1/10W	C451	1-124-225-00	ELECT 100MF	20% 6.3V
R413	1-216-075-00	METAL CHIP 12K 5%	1/10W	C452	1-124-224-00	ELECT 47MF	20% 6.3V
R414	1-216-079-00	METAL CHIP 18K 5%	1/10W	C453	1-135-072-21	TANTAL. CHIP 0.22MF	20% 35V
R417	1-216-083-00	METAL CHIP 27K 5%	1/10W	C454	1-135-072-81	TANTAL. CHIP 0.22MF	20% 35V
R418	1-216-077-00	METAL CHIP 15K 5%	1/10W	C455	1-163-141-00	CERAMIC CHIP 0.001MF	10% 50V
R419	1-249-416-11	CARBON 820 5%	1/4W	C456	1-163-035-00	CERAMIC CHIP 0.047MF	10% 25V
R420	1-216-047-00	METAL CHIP 820 5%	1/10W	C457	1-135-099-00	TANTAL. CHIP 2.2MF	20% 6.3V
R421	1-216-079-00	METAL CHIP 18K 5%	1/10W	<u>CONNECTOR</u>			
R422	1-216-049-00	METAL CHIP 1K 5%	1/10W	CN451	*1-564-013-00	PIN, CONNECTOR 3P	
R423	1-216-049-00	METAL CHIP 1K 5%	1/10W	<u>IC</u>			
R424	1-216-057-00	METAL CHIP 2.2K 5%	1/10W	IC451	8-759-111-56	IC UPC4572G2	
R425	1-216-061-00	METAL CHIP 3.3K 5%	1/10W				
R426	1-216-060-00	METAL CHIP 3K 5%	1/10W				
R427	1-216-057-00	METAL CHIP 2.2K 5%	1/10W				
R428	1-216-077-00	METAL CHIP 15K 5%	1/10W				

When indicating parts reference number, please include the board name.



**MA-21****MJ-12****FP-53****VF-10**

Ref.No	Part No.	Description	Remark
<u>TRANSISTOR</u>			
Q451	8-729-162-44	TRANSISTOR 2SB624-T1BV4	
<u>RESISTOR</u>			
R451	1-216-067-00	METAL CHIP 5.6K 5% 1/10W	
R452	1-216-071-00	METAL CHIP 8.2K 5% 1/10W	
R453	1-216-162-00	METAL CHIP 33 5% 1/8W	
R454	1-216-097-00	METAL CHIP 100K 5% 1/10W	
R455	1-216-103-00	METAL CHIP 180K 5% 1/10W	
R456	1-216-101-00	METAL CHIP 150K 5% 1/10W	
R457	1-216-065-00	METAL CHIP 4.7K 5% 1/10W	
R458	1-216-067-00	METAL CHIP 5.6K 5% 1/10W	
R459	1-216-748-11	METAL CHIP 39K 5% 1/10W	
R460	1-216-069-00	METAL CHIP 6.8K 5% 1/10W	
R461	1-216-061-00	METAL CHIP 3.3K 5% 1/10W	
R462	1-216-001-00	METAL CHIP 10 5% 1/10W	
R463	1-216-296-00	METAL CHIP 0 5% 1/8W	
R464	1-216-296-00	METAL CHIP 0 5% 1/8W	
R465	1-216-296-00	METAL CHIP 0 5% 1/8W	
*****			
*1-620-826-22	MJ-12 BOARD	*****	
<u>CAPACITOR</u>			
C471	1-163-035-00	CERAMIC CHIP 0.047MF	50V
<u>CONNECTOR</u>			
CN471	*1-564-014-00	PIN, CONNECTOR 4P	
<u>DIODE</u>			
D471	8-719-911-19	DIODE 1SS119	
<u>JACK</u>			
J471	1-507-921-00	JACK	
J472	1-563-454-11	JACK, MINIATURE	
*****			
A-7060-693-A	FP-53 BOARD, COMPLETE	*****	
3-713-904-01	HOLDER (2), LED		
<u>DIODE</u>			
D302	8-719-940-81	DIODE GL452S	
D303	8-719-801-55	TLP907-0	
D304	8-719-801-55	TLP907-0	
<u>SWITCH</u>			
S301	1-570-869-11	SWITCH, PUSH (2 KEY)	

Ref.No	Part No.	Description	Remark
*A-7060-777-A VF-10 BOARD, COMPLETE *****			
1-526-926-21	SOCKET ASSY, CRT		
<u>CAPACITOR</u>			
C951	1-124-222-00	ELECT 22MF	20% 6.3V
C952	1-163-081-00	CERAMIC CHIP 0.22MF	25V
C953	1-136-175-00	FILM 0.68MF	5% 50V
C954	1-124-584-00	ELECT 100MF	20% 10V
C955	1-163-137-00	CERAMIC CHIP 680PF	10% 50V
C956	1-162-637-11	CERAMIC CHIP 0.47MF	16V
C957	1-163-033-00	CERAMIC CHIP 0.022MF	10% 25V
C958	1-124-462-00	ELECT 10MF	20% 10V
C959	1-163-209-00	CERAMIC CHIP 0.0015MF	5% 50V
C960	1-163-121-00	CERAMIC CHIP 150PF	5% 50V
C961	1-163-077-00	CERAMIC CHIP 0.1MF	50V
C963	1-124-442-00	ELECT 330MF	20% 6.3V
C964	1-124-587-11	ELECT 220MF	20% 6.3V
C965	1-163-077-00	CERAMIC CHIP 0.1MF	50V
C966	1-163-023-00	CERAMIC CHIP 0.015MF	10% 50V
C967	1-124-255-00	ELECT 1MF	20% 50V
C968	1-163-141-00	CERAMIC CHIP 0.001MF	10% 50V
C969	1-163-013-00	CERAMIC CHIP 0.0022MF	10% 50V
C971	1-163-021-00	CERAMIC CHIP 0.01MF	10% 50V
C972	1-163-013-00	CERAMIC CHIP 0.0022MF	10% 50V
C973	1-124-971-11	ELECT 3.3MF	20% 63V
C974	1-162-697-11	CERAMIC 0.001MF	20% 1.5KV
C975	1-102-038-00	CERAMIC 0.001MF	99% 500V
C976	1-163-077-00	CERAMIC CHIP 0.1MF	50V
C977	1-131-388-00	TANTALUM 68MF	10% 6.3V
<u>CONNECTOR</u>			
CN951	*1-566-164-11	PIN, CONNECTOR 2P	
CN952	*1-564-001-11	PIN, CONNECTOR 2P	
CN953	*1-564-001-11	PIN, CONNECTOR 2P	
CN954	*1-566-164-21	PIN, CONNECTOR 2P	
CN955	*1-564-001-11	PIN, CONNECTOR 2P	
<u>DIODE</u>			
D951	8-719-400-20	DIODE MA152WA	
D952	8-719-801-48	DIODE 1SS193	
D953	8-719-801-45	DIODE 1SS187	
<u>IC</u>			
IC951	8-759-403-49	IC AN2510S	
<u>COIL</u>			
L951	1-408-980-21	MICRO INDUCTOR 68UH	
L952	1-459-683-11	COIL, FERRITE (HLC)	
L953	1-408-978-21	MICRO INDUCTOR 47UH	

The components identified by shading and mark **Δ** are critical for safety. Replace only with part number specified.

When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description	Remark	Ref.No	Part No.	Description	Remark
<u>IC LINK</u>				<u>MISCELLANEOUS</u>			
PS951 <u>A</u> 1-532-933-11 LINK, IC (0.25A)				*****			
<u>TRANSISTOR</u>				1-464-824-11 CONVERTER UNIT, DC/DC			
Q951	8-729-100-67	TRANSISTOR 2SC1623-L7		1-535-574-11 TERMINAL, SHAFT GROUND			
Q952	8-729-162-44	TRANSISTOR 2SB624-BV4		*1-536-947-21 TERMINAL BOARD (A)			
Q953	8-729-100-67	TRANSISTOR 2SC1623-L7		1-542-091-21 MICROPHONE, ELECTRET CONDENSER			
Q954	8-729-106-64	TRANSISTOR 2SD1615		1-547-242-11 LENS, ZOOM (VCL-1206YH)			
<u>RESISTOR</u>				1-556-824-61 CORD, CONNECTION (WITH PLUG) 8P			
R951	1-216-306-11	METAL CHIP 3.9 5% 1/10W		1-559-324-21 SOCKET (TERMINAL BOARD (B))			
R952	1-216-063-00	METAL CHIP 3.9K 5% 1/10W		1-807-238-11 SENSOR, DEW CONDENSATION			
R953	1-216-057-00	METAL CHIP 2.2K 5% 1/10W		C901 1-161-051-00 CAP, CERAMIC 0.01MF X			
R954	1-216-671-11	METAL CHIP 6.8K 0.50% 1/10W		L901 <u>A</u> 1-451-296-21 DEFLECTION YOKE (BACK & WHITE)			
R955	1-216-101-00	METAL CHIP 150K 5% 1/10W		M902 8-835-223-01 MOTOR, DC BHF-3301B (CAPSTAN)			
R956	1-216-017-00	METAL CHIP 47 5% 1/10W		M903 1-541-508-11 MOTOR, DC (LOADING)			
R957	1-216-057-00	METAL CHIP 2.2K 5% 1/10W		M904 3-707-369-01 METER ASSY, EE			
R958	1-216-093-00	METAL CHIP 68K 5% 1/10W		M905 1-541-536-11 MOTOR, AF			
R959	1-216-067-00	METAL CHIP 5.6K 5% 1/10W		M906 1-541-537-11 MOTOR, ZOOM			
R960	1-216-063-00	METAL CHIP 3.9K 5% 1/10W		S901 1-554-944-41 SWITCH, PUSH (ZOOM)			
R961	1-216-226-00	METAL CHIP 15K 5% 1/8W		S902 1-553-226-00 SWITCH, LEAF (CC DOWN)			
R962	1-216-121-00	METAL CHIP 1M 5% 1/10W		V901 <u>A</u> 1-546-061-11 CATHODE-RAY TUBE, B/W			
R963	1-216-295-00	METAL CHIP 0 5% 1/10W		*****			
R964	1-216-051-00	METAL CHIP 1.2K 5% 1/10W		<u>ACCESSORIES AND PACKING MATERIALS</u>			
R965	1-216-041-00	METAL CHIP 470 5% 1/10W		*****			
R966 <u>A</u>	1-216-051-00	METAL CHIP 1.2K 5% 1/10W		<u>Part No.</u> <u>Description</u> <u>Remark</u>			
R967	1-216-073-00	METAL CHIP 10K 5% 1/10W		3-712-595-11 BELT, SHOULDER			
R968 <u>A</u>	1-216-073-00	METAL CHIP 10K 5% 1/10W		*3-718-294-01 CUSHION (UPPER)			
R970	1-216-125-00	METAL CHIP 1.5M 5% 1/10W		*3-718-295-01 CUSHION (LOWER)			
R971	1-216-130-11	METAL CHIP 2.4M 5% 1/10W		*3-719-812-01 CARTON, OUTER			
R972	1-216-119-00	METAL CHIP 820K 5% 1/10W		*3-764-631-12 INSTRUCTION, DEW CONDENSATION			
R973	1-216-065-00	METAL CHIP 4.7K 5% 1/10W		3-769-231-11 MANUAL, INSTRUCTION (ENGLISH): AEP/E/UK MODEL			
R974	1-216-049-00	METAL CHIP 1K 5% 1/10W		3-769-231-41 MANUAL, INSTRUCTION			
R976	1-216-121-00	METAL CHIP 1M 5% 1/10W		(FRENCH, GERMAN, DUTCH): AEP/E MODEL			
R977	1-216-041-00	METAL CHIP 470 5% 1/10W		3-769-231-51 MANUAL, INSTRUCTION			
<u>VARIABLE RESISTOR</u>				(SPANISH, SWEDISH, ITALIAN): AEP/E MODEL			
RV951	1-237-431-11	RES, ADJ, CARBON 220		3-769-231-71 MANUAL, INSTRUCTION (ARABIC): E MODEL			
RV952	1-228-920-00	RES, ADJ, CARBON 2.2K		<u>ACCESSORY KIT</u>			
RV953	1-230-497-11	RES, ADJ, CARBON 22K		A-6767-226-A MODULATOR ASSY (AEP/E MODEL)			
RV954	1-230-203-00	RES, ADJ, METAL GLAZE 2.2M		A-6767-227-A MODULATOR ASSY (UK MODEL)			
RV955	1-230-203-00	RES, ADJ, METAL GLAZE 2.2M		*****			
<u>TRANSFORMER</u>							
T951 <u>A</u>	1-439-396-11	TRANSFORMER ASSY, FLYBACK					
*****							
*1-621-803-11 LD-7 BOARD							
*****							
<u>DIODE</u>							
D954	8-719-801-26	DIODE TLR223					

The components identified by shading and mark A are critical for safety. Replace only with part number specified.

When indicating parts by reference number, please include the board name.

## SECTION 7 CAMERA SECTION ADJUSTMENT

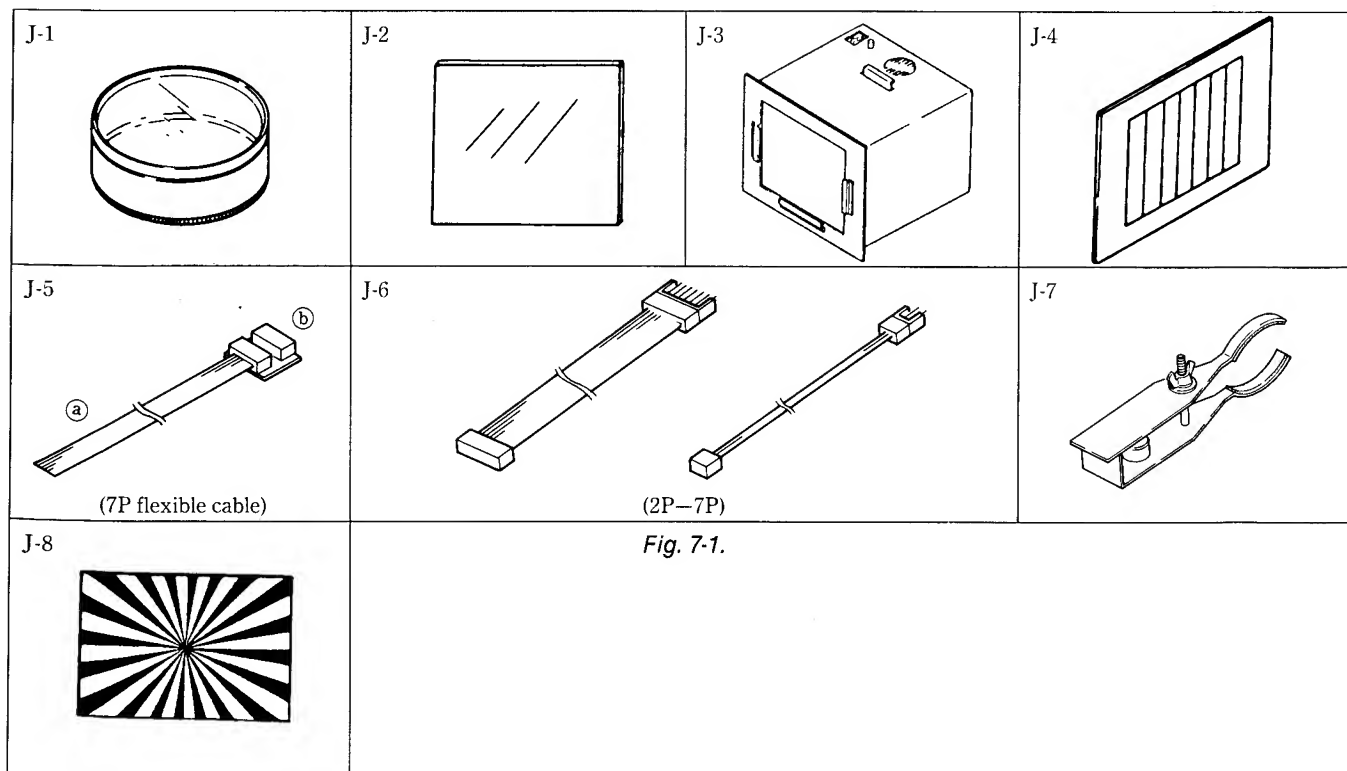
During the adjustment see the parts location diagram relevant to the adjustment on page 240.

### PREPARATION BEFORE ADJUSTMENT (CAMERA SECTION)

#### 7-1. LIST OF SERVICING JIGS

● Oscilloscope ● AC pack ● Screwdriver ● L wrench ● Stop watch ● Color monitor TV ● Vectorscope

Ref No.	Name	Part Code	Use
J-1	Filter (C22)	J-6080-829-A	R gain and B gain adjustment
J-2	ND filter 0.4	J-6080-806-A	IRIS set adjustment, MAX gain adjustment, LLA adjustment
	ND filter 0.1	J-6080-807-A	IRIS set adjustment, LLA adjustment
	ND filter 0.9	J-6080-833-A	MAX gain adjustment, LLA adjustment (use 2 pc.)
J-3	Pattern box PTB-500* <sup>1</sup>	J-6029-140-A	
J-4	Pattern box color chart	J-6020-250-A	
J-5	a Flat cable C (flexible cable of 7P)	J-6080-874-A	
	b Extension board	J-6080-868-A	
J-6	Extension cable (7P)	J-6080-869-A	
	Extension cable (4P)	J-6080-871-A	
	Extension cable (3P)	J-6080-872-A	
J-7	Lens block fixing jig	J-6080-894-A	
J-8	Siemens-star	J-6080-875-A	Flange back adjustment



## 7-2. PREPARATION

### Note:

Refer to SECTION 2. DISASSEMBLY as to details for remove the cabinets and boards.

- 1) Remove the front cabinet, rear cabinet, cabinet (R) and cabinet (L).
- 2) Separate the camera section and video section from each other.
- 3) Open the camera board in the manner mentioned in 2. DISASSEMBLY OPENING THE CAMERA BOARD.
- 4) Connect the extension cable as shown in Fig. 7-3.
- 5) Connect the EVF (Electronic View Finder) to CN207 of the MV-12 board because it is required for adjusting and checking the following parts:
  - 1) Camera DC-DC converter voltage check
  - 2) EVF section adjustment

Adjustments and checks other than those above can be performed on the monitor screen.

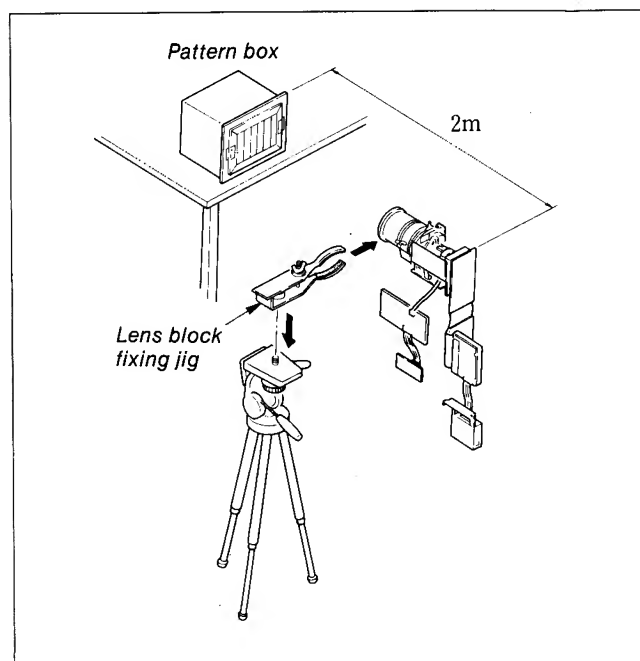


Fig. 7-2.

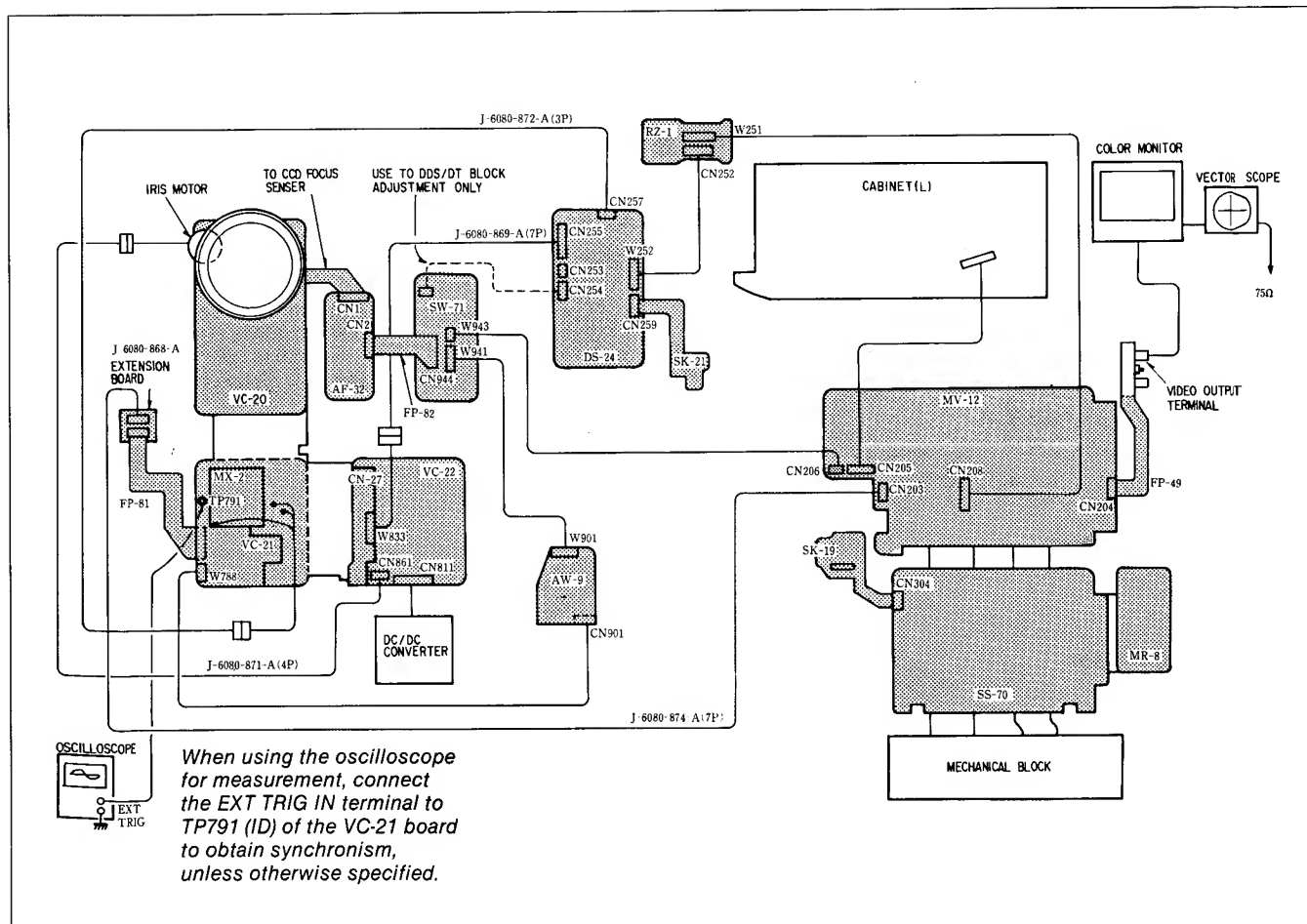


Fig. 7-3.

### 7-3. PRECAUTIONS

#### 1) Setting the switches

Adjust the switches to the following positions, when not specified:

1. Set the FOCUS switch (SW-71 board, S945) to MANUAL
2. Set the WHITE BALANCE switch (SW-71 board, S941) to INDOOR (☉)

#### 2) Adjustment Procedure

As a rule, adjust in a described order.

#### 3) Subject

1. Colour bar chart (standard picture frame)

Adjust the picture frame as shown in Fig. 7-4. When using a colour chart for adjustment. (Standard picture frame).

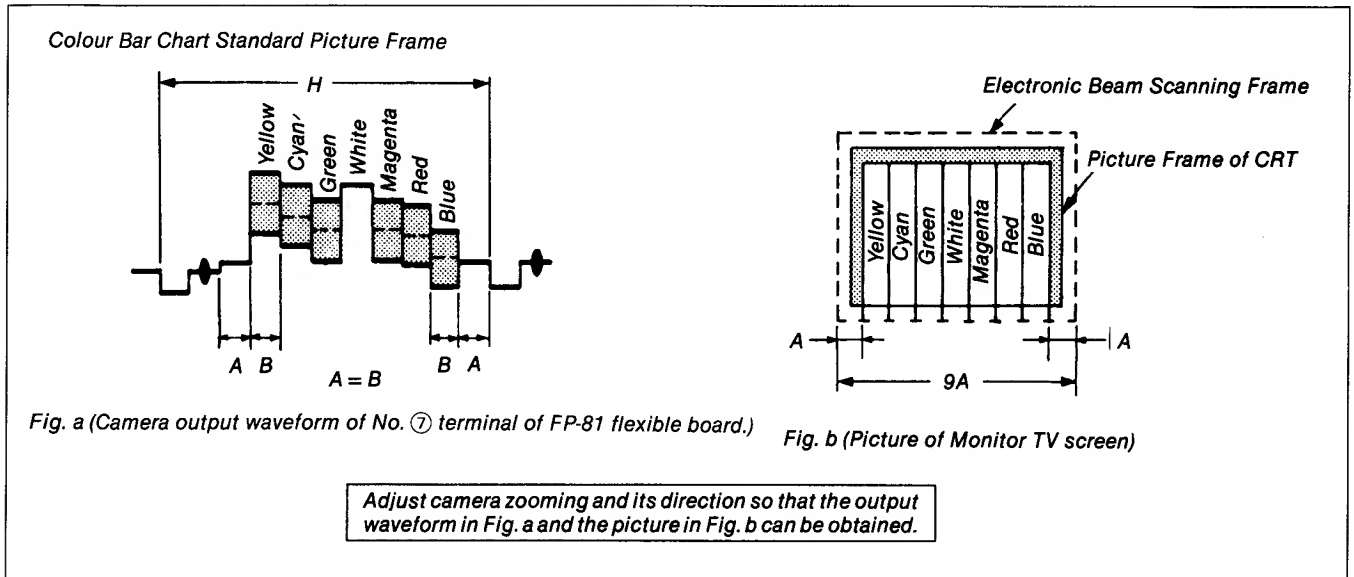


Fig. 7-4.

#### 2. Full white pattern

Remove the colour bar chart from the pattern box and shift the zoom lever fully to the TELE (72mm) side.

#### 3. High brightness pattern

Create a high brightness pattern as shown in Fig. 7-5, and adjust the picture frame as shown in Fig. 7-6.

#### 4. Siemens star (J-6080-875-A)

Adjust a camera direction so that a siemens star center will coincide with a monitor screen center on the monitor TV screen.

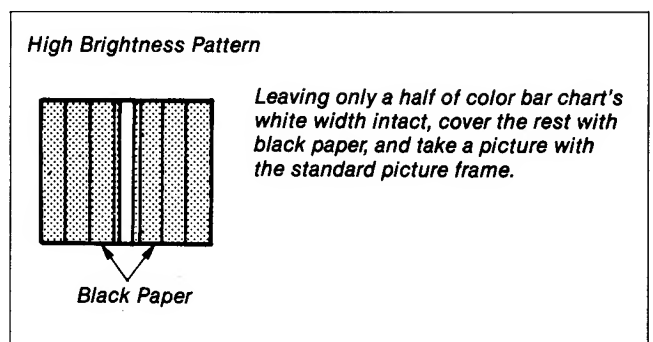


Fig. 7-5.

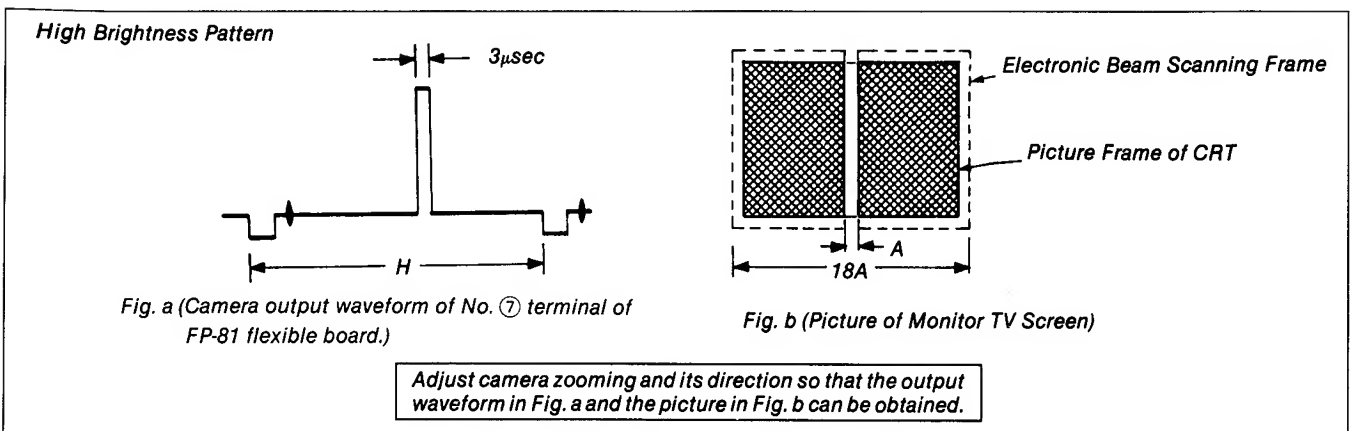


Fig. 7-6.



## 7-4. CAMERA SYSTEM ADJUSTMENT

### 7-4-1. Flange Back Adjustment

Subject	Siemens star at a distance of 2m in the front of a lens datum level (marked with $\phi$ )
Measurement point	Confirm with the monitor TV.
Measurement equipment	
Adjustment element	Flange back adjustment pin
Tools	L wrench (1.5mm), regular screwdriver

#### [Adjustment Method]

- 1) Set the FOCUS switch (SW-71 board, S945) to a MANUAL position.
- 2) Place the Siemens star at a distance of 2m in the front of the lens datum level (see Fig. 7-2).
- 3) Adjust the position of the camera section so that the center of the Siemens star displayed on the monitor screen will coincide with the center of the monitor screen.
- 4) Check that the lens zoom lever can be rotated fully to WIDE (12mm) and TELE (72mm), and rotate fully to the WIDE side. (Also check that the monitor screen is zooming.)
- 5) Push the BACK LIGHT button to set up BACK LIGHT mode and open iris.
- 6) Set the lens focus ring index to the center, "2".

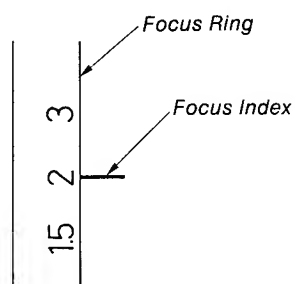
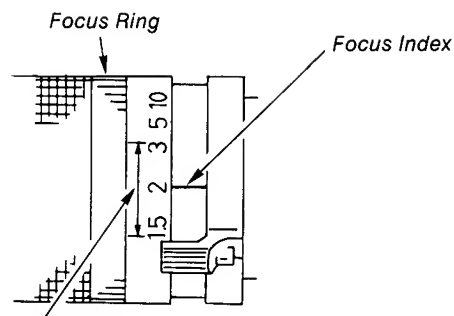


Fig. 7-7.



The focus index should be within this range.

Fig. 7-8.

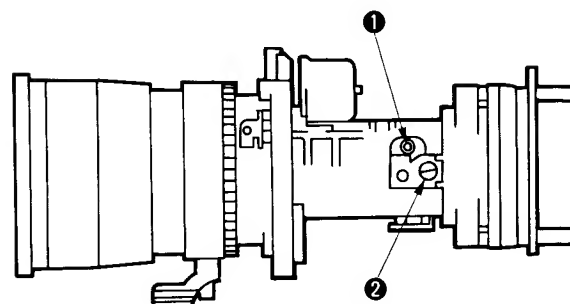


Fig. 7-9.

- 11) Set zoom lever to end of TELE.
- 12) Turn the focus ring and stop at the position where the wedge becomes most clear. Confirm then that the focus indicator is within  $\pm 1.5\text{mm}$  of "2".

- 7) Loosen the hexagon socket head setscrew ❶. (See Fig. 7-9)
- 8) Viewing the monitor screen, turn the flange back adjustment pin ❷ to make clearest the wedge at the center of the Siemens star on the screen. (Confirm that it is clearest, by turning the pin 2 or 3 times to the right and left.)  
**Note:**  
Do not turn the adjustment pin too much in one direction.
- 9) Securely hold the flange back adjusting pin ❷ to prevent it from being rotated, tighten the hexagon socket head setscrew ❶.
- 10) Set the zoom lever fully to side and rotate the focus ring. Be sure that the position in which the wedge becomes most clear is within a range shown in Fig. 7-8.

#### 7-4-2. Camera DC-DC Converter Voltage Check (VC-22 Board)

Measurement equipment	Digital voltmeter
5V check	
Specified value	$5.05 \pm 0.1V$
Measurement Point	Pin ⑧ of CN881
8.5V check	
Specified value	$8.5 \pm 0.15V$
Measurement Point	Pin ⑦ of CN881
12V check	
Specified value	$12.0 \pm 0.3V$
Measurement Point	Pin ⑥ of CN881
20V check	
Specified value	$20 \pm 0.5V$
Measurement Point	Pin ④ of CN881

#### Note:

Check with the EVF section connected.

#### [Checking Method]

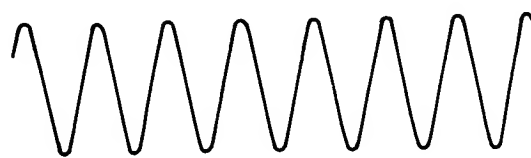
- 1) Each supply voltage should satisfy its specified value.

#### 7-4-3. Clock Oscillation Frequency Adjustment (VC-20 and DT-61 Boards)

Measurement Point	Pin ③⑥ (CL) of the DT-61 board
Measurement equipment	Frequency counter
Adjustment element	CT721 of VC-20 board
Specified value	$14187500 \pm 71Hz$

#### [Adjustment Method]

- 1) Adjust to  $14187500 \pm 71Hz$  with CT721.



$(14,187,500 \pm 71Hz)$

Fig. 7-10.

#### 7-4-4. PLL Adjustment (VC20 Board)

Measurement Point	Pin ②② of IC731
Measurement Instrument	Digital voltmeter
Adjustment Element	CT731
Specified value	$2.5 \pm 0.2Vdc$

#### [Adjusting Method]

- 1) Adjust to  $2.5 \pm 0.2Vdc$  with CT731.

#### 7-4-5. Iris Set Adjustment (VC-20 and IA-1/VC-22 Boards)

Subject	Colour bar chart standard picture frame
Filter	ND filters 0.4 and 0.1
Measurement point	TP751 (CCD OUT) of the VC-20 board
Measurement equipment	Oscilloscope
Adjustment element	RV722 (IRIS SET) of the IA-1 board
Specified value	$250 \pm 5mV$

#### [Adjustment Method]

- 1) With no ND filter attached, adjust a signal level to  $250 \pm 5mV$  using RV722 of the IA-1 board.  
(Be sure to complete adjustment by turning RV722 in the direction which reduces the signal level.)
- 2) Attach the ND filter 0.5 ( $0.4 + 0.1$ ) to the front of the lens, and confirm that the signal level changes smoothly.
- 3) Detach the ND filter, and confirm that the signal level is  $250 \pm 5mV$ .
- 4) When the specified value is not satisfied, repeat the above-mentioned steps 1) through 3).

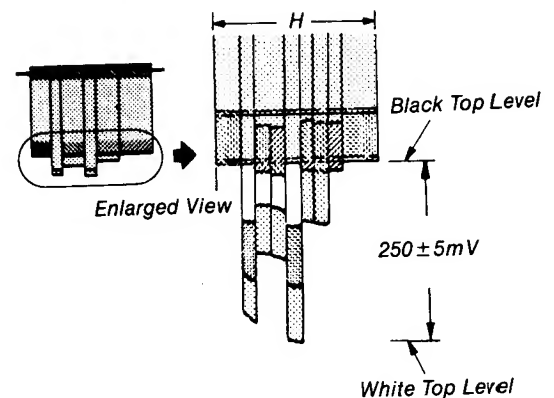


Fig. 7-11.

#### 7-4-6. AGC Set Adjustment (SH-2/VC-20 and IA-1 Boards)

Subject	Colour bar chart standard picture frame
Measurement point	TP752 (G DET) of the VC-20 board
Measurement equipment	Oscilloscope (GND: TP753 of the VC-20 board)
Adjustment element	RV721 (AGC SET) of the IA-1 board
Specified value	$250 \pm 5mV$

#### Note:

Set to the mechanical center the following 3 RVs of the SH-2 board:

1. RV006 (R GAIN)
2. RV007 (B GAIN)
3. RV008 (MAX GAIN)

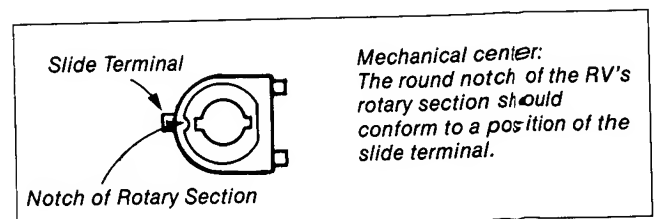


Fig. 7-12.

#### [Adjustment Method]

- 1) Adjust a signal level to  $250 \pm 5\text{mV}$  with RV721 of the IA-1 board.

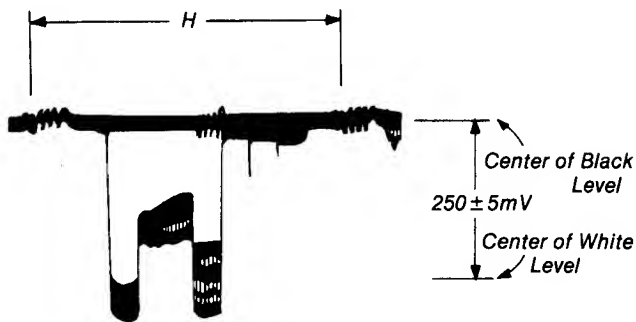


Fig. 7-13.

#### 7-4-7. G Pedestal Adjustment (1) (VC-21, SH-2/VC-20 Boards)

Subject	All black (Cover a black cap on the lens.)
Measurement point	TP781 (G-γ) of the VC-21 board
Measurement equipment	Oscilloscope
Adjustment element	RV001 (G-PEDESTAL) of the SH-2 board
Specified value	$50 \pm 5\text{mV}$

#### Note:

Rotate fully the following 2 RVs of the SH-2 board in the clockwise direction:

1. RV002 (WHITE CLIP(I))
2. RV003 (GAMMA)

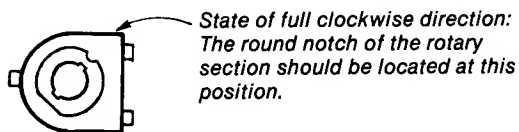


Fig. 7-14.

#### [Adjustment Method]

- 1) Adjust a pedestal level to  $50 \pm 5\text{mV}$  with RV001 of the SH-2 board.

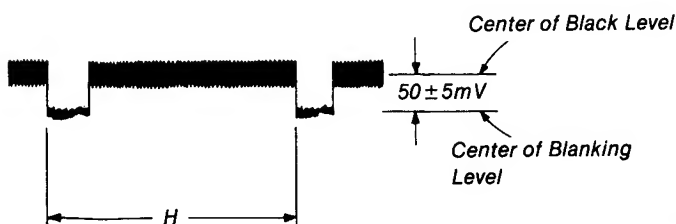


Fig. 7-15.

#### 7-4-8. G-γ Adjustment (VC-21 and SH-2/VC-20 Boards)

Subject	Colour bar chart standard picture frame
Measurement point	TP781 (G + γ) of the VC-21 board
Measurement equipment	Oscilloscope
Adjustment element	RV003 of the SH-2 board
Specified value	$380 \pm 10\text{mV}$

#### [Adjustment Method]

- 1) Adjust to  $380 \pm 10\text{mV}$  with RV003 of the SH-2 board.

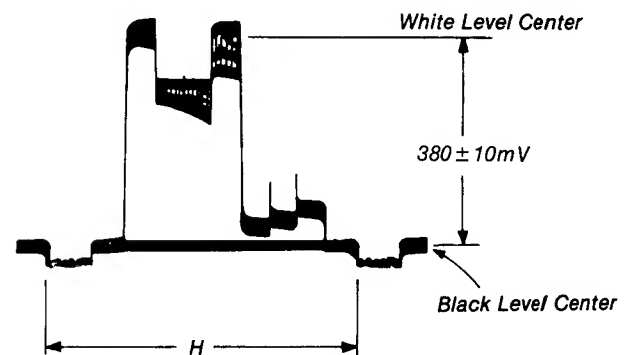


Fig. 7-16.

#### 7-4-9. White Clip Adjustment (1) (VC-21 and SH-2/VC-20 Boards)

Subject	High brightness pattern
Measurement Point	TP781 (G-γ) of the VC-21 board
Measurement equipment	Oscilloscope
Adjustment element	RV002 (WHITE CLIP (1)) of the SH-2 board
Specified value	$520 \pm 10\text{mV}$

#### [Adjustment Method]

- 1) Adjust a white peak level to  $520 \pm 10\text{mV}$  with RV002 of the SH-2 board.

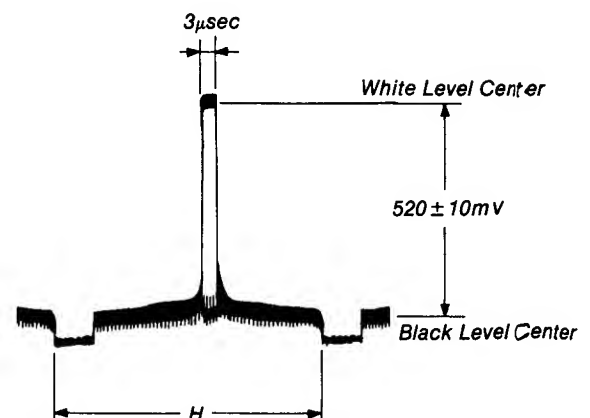


Fig. 7-17.

#### 7-4-10. G Pedestal Adjustment (2) (VC-21 and SH-2/VC-20 Boards)

Subject	All black (Cover a black cap on a lens.)
Measurement point	TP781 (G- $\gamma$ ) of the VC-21 board
Measurement equipment	Oscilloscope
Adjustment element	RV001 of the SH-2 board
Specified value	$25 \pm 5\text{mV}$

##### [Adjustment Method]

- 1) Adjust to  $25 \pm 5\text{mV}$  with RV001 of the SH-2 board.

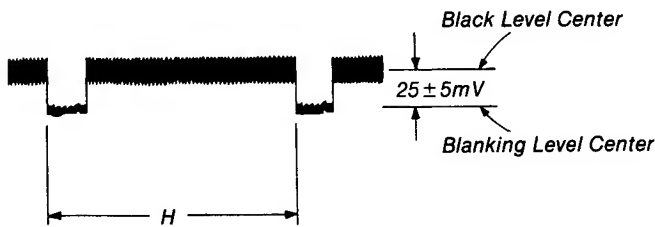


Fig. 7-18.

#### 7-4-11. G- $\gamma$ Level Check (VC-21 and SH-2/VC-20 Boards)

Subject	Colour bar chart standard picture frame
Measurement point	CH1: TP781 (G- $\gamma$ ) of the VC-21 board CH2: TP782 (RB- $\gamma$ )
Measurement equipment	Oscilloscope
Adjustment element	RV002 of the SH-2 board
Specified value	$370 \pm 15\text{mV}$

##### [Checking Method]

- 1) Check that the white level is  $370 \pm 15\text{mV}$ .
- 2) When the specified value is not, Use RV002 of the SH-2 board to meet it if the specified value is not satisfactory.

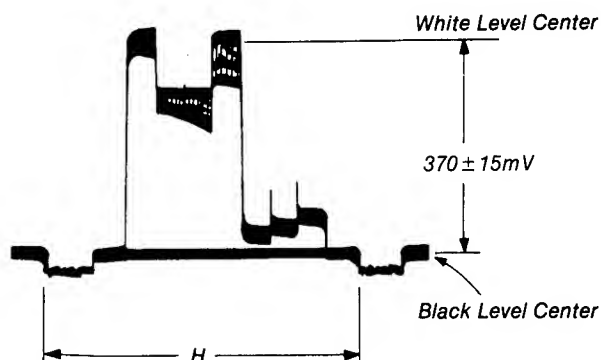


Fig. 7-19.

#### 7-4-12. RB Offset Adjustment (VC-21 and SH-2/VC-20 Boards)

Subject	All black (Cover the lens with a black cap.)
Measurement point	CH1: TP781 (G- $\gamma$ ) of the VC-21 board CH2: TP782 (RB- $\gamma$ ) of the VC-21 board
Measurement equipment	Oscilloscope ( Vertical mode: ADD CH2 polarity: INVERT )
Adjustment element	RV005 (R, OFF SET) of the SH-2 board RV004 (B, OFF SET) of the SH-2 board
Specified value	The blanking level should be at the center of a noise width.

##### [Adjustment Method]

- 1) Adjust the blanking level to the center of the noise width with RV005 and RV004 of the SH-2 board.

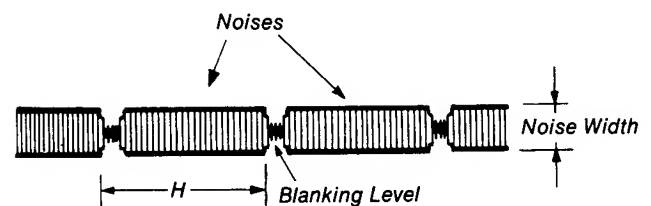


Fig. 7-20.

#### 7-4-13. White Balance Adjustment (VC-21 and SH-2/VC-20 Boards)

Subject	Colour bar standard picture frame
Measurement point	CH1 (X): Pin ④ of CN255 (B-Y) on the DS-24 board CH2 (Y): Pin ⑤ of CN255 (R-Y) on the DS-24 board
Measurement equipment	Oscilloscope (X-Y mode) GND: Pin ⑥ of CN255 on the DS-24 board
Adjustment element	RV006 (R GAIN) and RV007 (B GAIN) of the SH-2 board
Specified value	The white and black bright points should coincide with each other in location.

##### [Adjustment Method]

- 1) By turning RV006 and RV007 of the SH-2 board have the white bright point coincide with the black bright point in location.

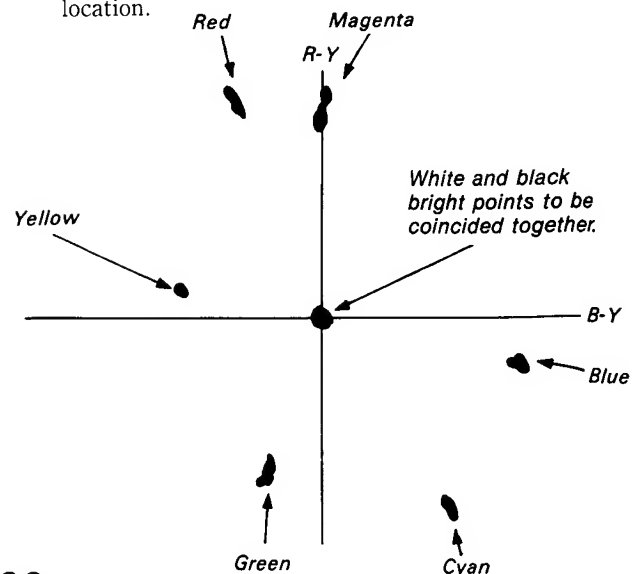


Fig. 7-21.

#### 7-4-14. MPX Adjustment (MX-2/VC-21 Boards)

Subject	All black (Cover a black cap on the lens)
Measurement point	CH1 (X): Pin ④ of CN255 (B-Y) on the DS-24 board CH2 (Y): Pin ⑤ of CN255 (R-Y) on the DS-24 board
Measurement equipment	Oscilloscope (X-Y mode)
Adjustment element	RV825 of the MX-2 board
Specified value	There should be only one black bright point whose size is minimum.

##### [Adjustment Method]

- 1) Adjust the black spots to one with RV825 of the MX-2 board.

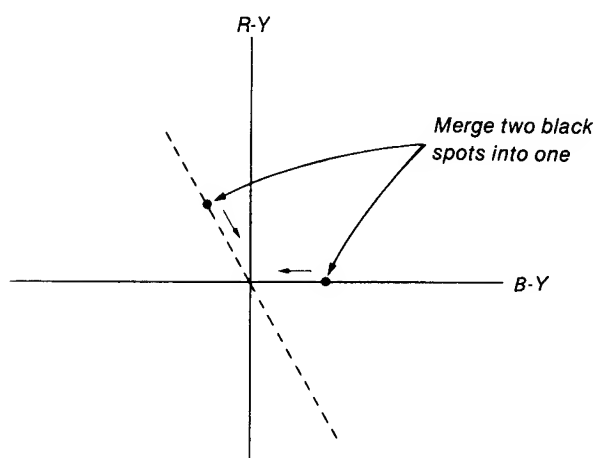


Fig. 7-22.

#### 7-4-15. Carrier Balance Adjustment (VC-22 Board)

Subject	Colour bar chart standard picture frame
Measurement point	Pin ⑦ of FP-81 (CAM OUT)
Measurement equipment	Oscilloscope
Adjustment element	RV804 (CB0°), RV803 (CB90°)
Specified value	The 4.43MHz component of a black part should be minimum.

##### [Adjustment Method]

- 1) Minimize the amplitude of the black part with RV804 and RV803.

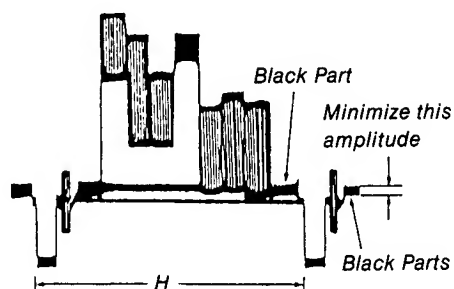


Fig. 7-23.

#### 7-4-16. Matrix Gain Adjustment (MX-2/VC-21 Boards)

Subject	White pattern (Include a black frame. See Fig. 7-24.)
Measurement equipment	Oscilloscope Vertical mode: ADD CH2 polarity: INVERT
G1 gain adjustment	
Measurement point	CH1: TP783 (G0) of the VC-21 board CH2: TP784 (G1) of the VC-21 board
Adjustment element	RV821 (G1) of the MX-2 board
Specified value	There should be no difference in level between white and black parts.
G2 gain adjustment	
Measurement point	CH1: TP783 (G0) of the VC-21 board CH2: TP785 (G2) of the VC-21 board
Adjustment element	RV823 (G2) of the MX-2 board
Specified value	There should be no difference in level between white and black parts.
RB1 gain adjustment	
Measurement point	CH1: TP788 (RB0) of the VC-21 board CH2: TP787 (RB1) of the VC-21 board
Adjustment elements	RV822 (RB1) of the MX-2 board
Specified value	There should be no difference level between white and black parts.
RB2 gain adjustment	
Measurement point	CH1: TP788 (RB0) of the VC-21 board CH2: TP786 (RB2) of the VC-21 board
Adjustment element	RV824 (RB2) of the MX-2 board
Specified value	There should be no difference in level between white and black parts.

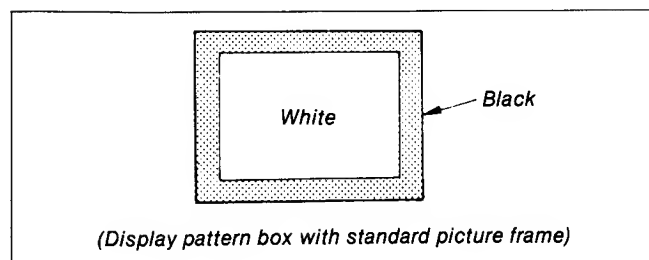


Fig. 7-24.

#### [Adjustment Method]

- 1) Eliminate differences in level between white and black parts with each RV.

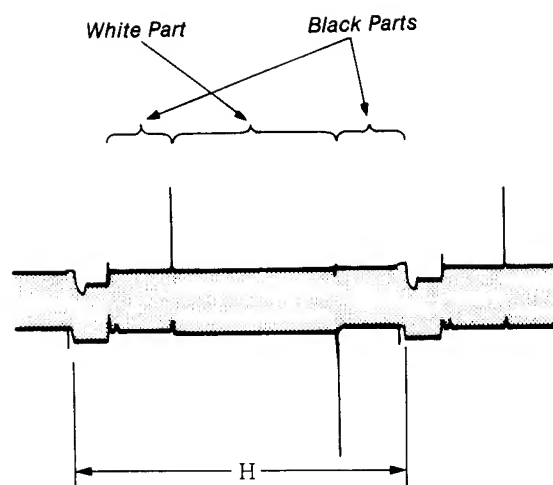


Fig. 7-25.

#### Note:

After adjustment, confirm the MPX adjustment and carrier balance adjustment. When each specified value is not met, make readjustment.

#### 7-4-17. Set up Adjustment (VC-22, CN-27 Board)

Subject	All black (Cover a black cap on the lens)
Measurement point	Pin ⑦ of FP-81 (CAM OUT)
Measurement equipment	Oscilloscope
Adjustment element	RV807 (PED) on the CN-27 board
Specified value	$25 \pm 5\text{mV}$

#### [Adjustment Method]

- 1) Adjust a setup level to  $25 \pm 5\text{mV}$  with RV807 on the CN-27 board.

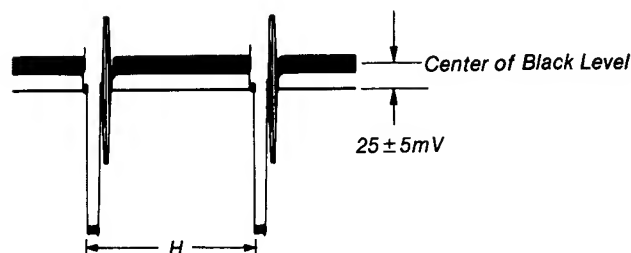


Fig. 7-26.



#### 7-4-18. Y Level Adjustment (VC-22 Board)

Subject	Colour bar chart (Standard picture frame)
Measurement point	Pin ⑦ of FP-81 (CAM OUT)
Measurement equipment	Oscilloscope
Adjustment element	RV809 (YG)
Specified value	$350 \pm 10\text{mV}$

##### Note:

Turn RV810 (WC2) fully in the clockwise direction to maximize the signal level of TP803.

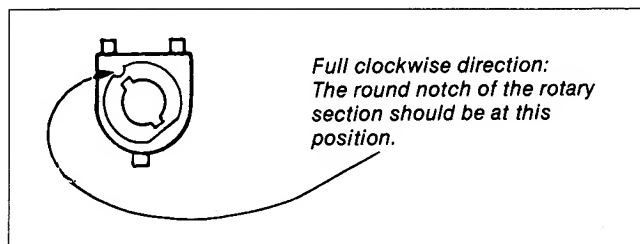


Fig. 7-27.

##### [Adjustment Method]

- 1) Adjust the Y level to  $350 \pm 10\text{mV}$  with RV809.

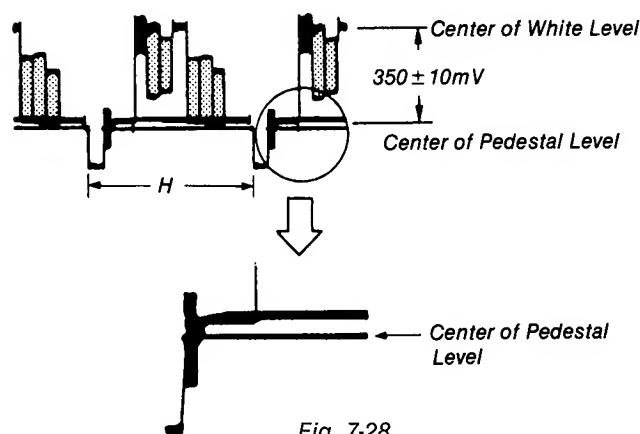


Fig. 7-28.

##### Note:

After adjustment, check the SETUP adjustment. When the specified value is not met, make readjustment.

#### 7-4-19. Aperture Adjustment (VC-22 and IA-1/VC-22 Boards)

Subject	Colour bar chart standard picture frame
Measurement point	Pin ⑦ of FP-81 (CAM OUT)
Measurement equipment	Oscilloscope
Adjustment element	RV802 (APS) and RV801 (APL) of the VC-22 board
Specified value	RV802: Aperture level at $135 \pm 5\text{mVp-p}$ RV801: Aperture level at $80 \pm 5\text{mVp-p}$

##### Note 1:

Preset the following RVs:

1. RV802 (APS) of the VC-22 board ... Mechanical center
2. RV801 (APL) of the VC-22 board ... Fully in the clockwise direction (↻).
3. RV810 (WHITE CLIP (2)) of the VC-22 board ... Fully in the clockwise direction (↻).
4. RV723 (LLA) of the IA-1 Board ... Fully in the counter clockwise direction (↺).

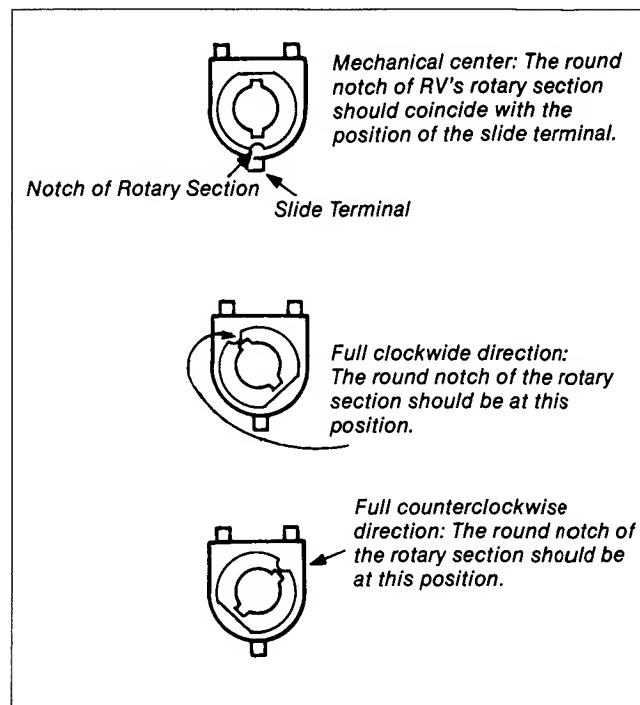


Fig. 7-29.

##### [Adjustment Method]

- 1) After focusing, swing the camera section slightly to the right and left and fix it at the point where an aperture level between white and magenta (see Fig. 7-30) is maximized.
- 2) Adjust the aperture level to  $135 \pm 5\text{mV}$  with RV802 of the VC-22 board.
- 3) Adjust the aperture level to  $80 \pm 5\text{mV}$  with RV801 of the VC-22 board.

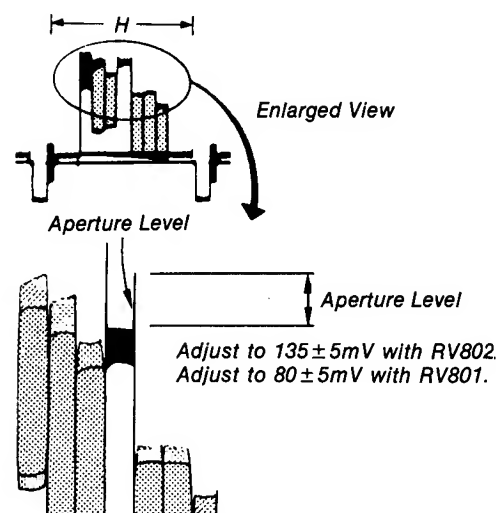


Fig. 7-30.

##### Note 2:

Re-adjust the RV810 and RV723 being preset in 'Note 1', following each item of adjustment.

#### 7-4-20. White Clip Adjustment (2) (VC-22 Board)

Subject	High brightness pattern
Measurement point	Pin ⑦ of FP-81 (CAM OUT)
Measurement equipment	Oscilloscope
Adjustment element	RV810 (WHITE CLIP (2))
Specified value	$420 \pm 10\text{mV}$

##### [Adjustment Method]

- 1) Adjust a signal level to  $420 \pm 10\text{mV}$  with RV810.

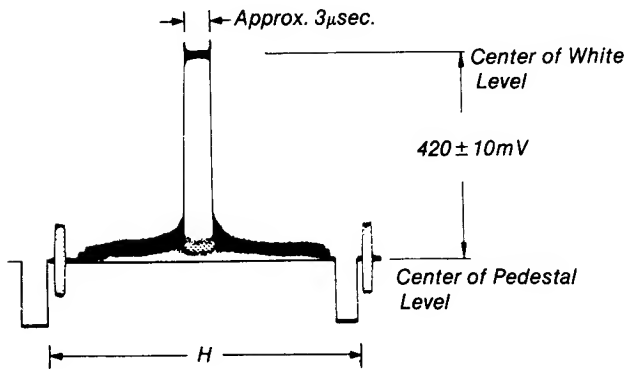


Fig. 7-31.

#### 7-4-21. Max. Gain Adjustment (VC-22 and SH-2/VC-20 Boards)

Subject	Colour bar chart standard picture frame
Filter	ND filter 0.9, 0.4 . . . 2 pcs.
Measurement point	Pin ⑦ of FP-81 (CAM OUT)
Measurement equipment	Oscilloscope
Adjustment element	RV008 (MAX GAIN) of the SH-2 board
Specified value	$180 \pm 5\text{mV}$

##### [Adjustment Method]

- 1) Cover an ND filter 1.7 (0.9+0.4+0.4) in front of the lens.
- 2) Adjust to  $180 \pm 5\text{mV}$  with RV008 of the SH-2 board.

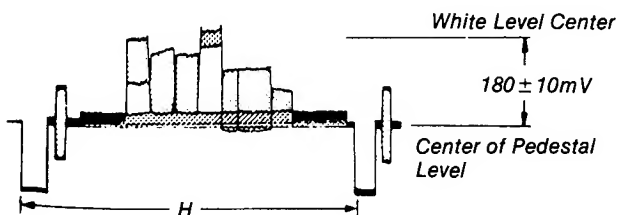


Fig. 7-32.

#### 7-4-22. AGC Set Confirmation/Adjustment (VC-20 and IA-1/VC-22 Boards)

Subject	Colour bar chart standard picture frame
Measurement point	TP752 (G DET) of the VC-20 board
Measurement equipment	Oscilloscope (GND: TP753 of the VC-20 board)
Adjustment element	RV721 (AGC SET) of the IA-1 board
Specified value	$250 \pm 15\text{mV}$

##### [Confirmation Method]

- 1) Check that a signal level is  $250 \pm 15\text{mV}$ .
- 2) When the specified value is not met, adjust to  $250 \pm 15\text{mV}$  with RV721 of the IA-1 board.

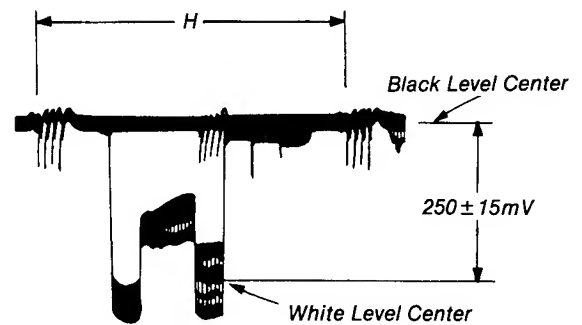


Fig. 7-33.

##### Note:

After adjustment, check the White Balance adjustment. If each specified value is not met, make readjustment.

#### 7-4-23. Burst Phase and Burst Level Adjustment (VC-22 Board)

Subject	Colour bar chart standard picture frame
Measurement point	Pin ⑦ of FP-81 (CAM OUT)
Measurement equipment	Oscilloscope Trigger slope: +
Adjustment element	RV806 (HUE) and RV805 (BURST GAIN) of the VC-22 board
Specified value	(Burst phase) should become a single line. (Burst level) $150 \pm 5\text{mVp-p}$

**Note:** When performing colour reproductivity adjustment with a vectorscope, this adjustment becomes unnecessary.

### [Adjusting Method]

- 1) Make burst waveform into a single line with RV806.  
There are 2 points in the rotating range of RV806 in which the waveform becomes a single line. Select the one in which the colour is reproduced correctly on the monitor screen.
- 2) Turn RV805 so that the burst amplitude becomes  $150 \pm 5 \text{ mVp-p}$ .

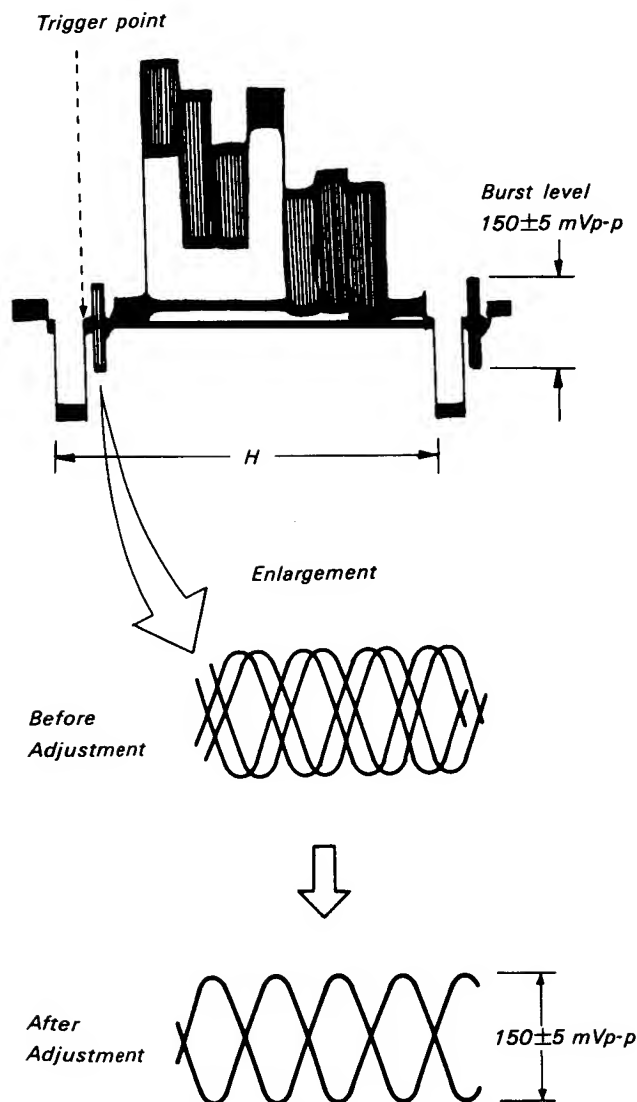


Fig. 7-34.

### 7-4-24. Colour Reproducibility Adjustment (Use a Vectorscope) (MX-2/VC-21 and VC-22 Boards)

Subject	Colour bar chart standard picture frame
Measurement point	VIDEO OUT terminal
Measurement equipment	Vectorscope *Paste a colour reproduction frame for vectorscope
Adjustment element	RV827 of the MX-2 board (B-Y GAIN) RV781 of the VC-21 board (B-Y MIX) RV782 of the VC-21 board (R-Y MIX) RV808 of the VC-22 board (CHROMA GAIN) RV806 of the VC-22 board (HUE) RV805 of the VC-22 board (BURST GAIN)
Specified value	Each colour bright point should be within a colour reproduction frame. (See Fig. 7-35)

#### Note:

Before this adjustment confirm that a burst bright point is at a specified position, and that a white bright point coincides with an origin. (When the white bright point and the origin do not coincide with each other, carry out white balance adjustment (RV006 and RV007 of the SH-2 board) and carrier balance adjustment (RV803 and RV804 of the VC-22 board).)

#### [Adjustment Method]

- 1) Turn RV806 and RV805 of the VC-22 board and match the burst bright spot at the specified location ( $135^\circ$ , 75%) on the vector scope.
- 2) Place a "red" bright point within the colour reproduction frame with RV808 of the VC-22 board and RV782 of the VC-21 board.
- 3) Place a "yellow" bright point within the colour reproduction frame with RV827 of the MX-2 board and RV781 of the VC-21 board.
- 4) Place each colour bright point within the colour reproduction frame, repeating the above-mentioned steps 2) and 3).
- 5) Place the white balance switch (S941 of the SW-55 board) outside (☼).
- 6) Check that the 'white' brightness point moves into the outside colour reproduction frame. (See Fig. 7-35)

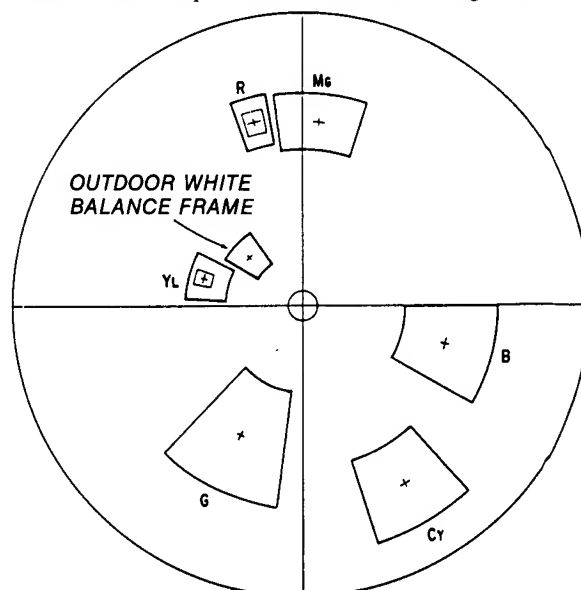


Fig. 7-35.

## 7-4-25. Colour Reproducibility Adjustment (Use a Oscilloscope)

### A. Gain Adjustment (MX-2/VC-21 and VC-22 Boards)

Subject	Colour bar chart standard picture frame
Measurement point	Pin ⑦ of FP-81 (CAM OUT)
Measurement equipment	Oscilloscope
Adjustment element	RV827 (B-Y GAIN) of the MX-2 board RV808 (CHROMA GAIN) of the VC-22 board
Specified value	"Magenta" level: $235 \pm 5\text{mVp-p}$ "Yellow" level: $131 \pm 5\text{mVp-p}$

#### [Adjustment Method]

- 1) Set RV781 (B-Y MIX) and RV782 (R-Y MIX) of the VC-21 board to the mechanical center.
- 2) Adjust an amplitude of "magenta" to  $235 \pm 5\text{mVp-p}$  with RV808 of the VC-22 board. (See Fig. 7-36 ①)
- 3) Adjust an amplitude of "yellow" to  $131 \pm 5\text{mVp-p}$  with RV827 of the MX-2 board. (See Fig. 7-36 ②)

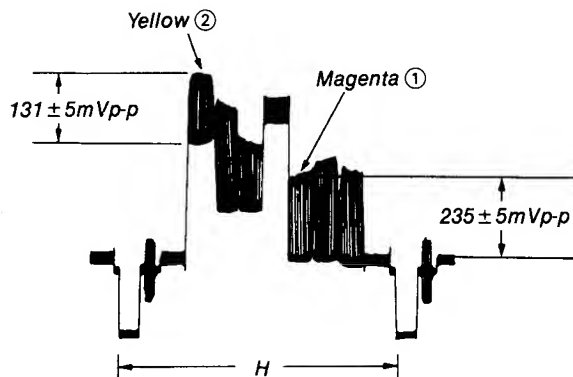


Fig. 7-36.

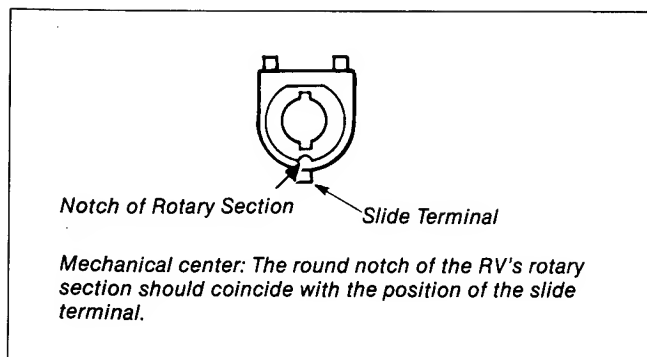


Fig.7-37.

### B. Hue Adjustment (VC-21 and SH-2/VC-20 Boards)

Subject	Colour bar chart standard picture frame
Measurement point	CH1 (X): Pin ④ of CN255 (B - Y) on the DS-24 board CH2 (Y): Pin ⑤ of CN255 (R - Y) on the DS-24 board
Measurement equipment	Oscilloscope (X - Y mode) GND: Pin ⑥ of CN255 on the DS-24 board *Paste a color reproduction frame for oscilloscope.
Adjustment element	RV781 (B - Y MIX) of the VC-21 board RV782 (R-Y) of the VC-21 board
Specified value	Each colour bright point should be within the colour reproduction frame. (See Fig. 7-38)

#### [Adjustment Method]

- 1) Coincide a "black" spot on the oscilloscope with the origin of the colour reproduction frame.
- 2) Check that a "white" bright point and a "black" bright point coincide with each other. (If they are not coincident, make white balance adjustment (RV006 and RV007 of the SH-2 board).)
- 3) Place a "red" bright point and a "yellow" bright point within the colour reproduction frame with RV781 and RV782 of the VC-21 board. (Check that each of other colour bright points is located within the colour reproduction frame.)

Set RV806 of the VC-22 board to the mechanical center (see Fig. 1-39).

- 4) Confirm colours reproduced on the monitor screen.

**Notes:** "Magenta" is reproduced reddish.

- 5) Place the white balance switch (S941 of SW-71 board) outdoor (☀).
- 6) Check that the white brightness point moves to the place between 'red' and 'yellow' standard frame.

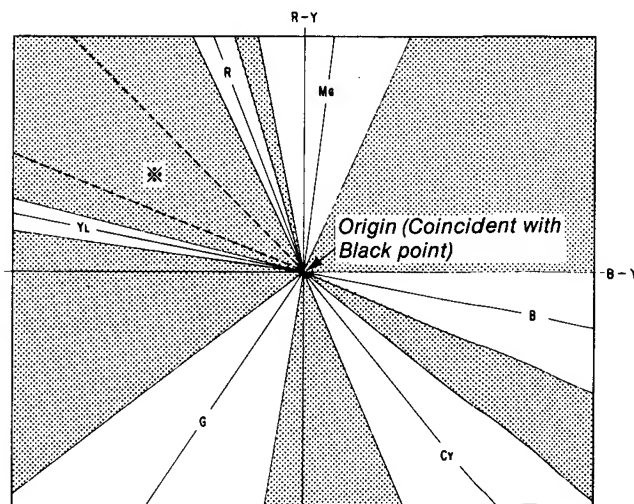


Fig. 7-38.

: Movable range of the white bright point under the condition that the white balance switch is turned into 'Outdoor' position.

#### 7-4-26. LLA Adjustment (IA-1/VC-22 Board)

Subject	Colour bar chart standard picture frame
Filter	ND filter 0.9 ... 1 pc. ND filter 1.0 ... 1 pc. ND filter 0.4 ... 1 pc.
Measurement point	Pin ⑤ of IA-1 board (LLA)
Measurement equipment	Oscilloscope (DC range)
Adjustment element	RV723 (LLA)
Specified value	"LOW LIGHT" should be displayed with the ND filter 1.4, and "LOW LIGHT" not displayed with the ND filter 1.3.

##### [Adjustment Method]

- 1) Attach the ND filter 1.4 (0.9+0.4+0.1) to the lens.
- 2) Turn RV723 and set Pin ⑤ level of the IA-1 board to "H" (5V).
- 3) Turn RV723 slowly and stop when it become "L" (0V).
- 4) Remove only ND filter of 0.1.
- 5) Confirm that the Pin ⑤ level of the IA-1 board becomes "H". (Response will take about 10 seconds.)
- 6) When it is still in "L" level, repeat steps 1) to 5).

#### 7-4-27. Auto-following white balance adjustment (AW-9 Board)

Subject	White pattern *Note 1)
Measurement point	CH1: Pin ⑤ of CN901 (R CONT) CH1: Pin ④ of CN901 (B CONT)
Measurement equipment	Oscilloscope (DC range)
Adjustment element	RV901

##### Note 1:

Make white-balance sensor (AW-9 board SB901) incident by light through white-dispersing plate which can be applied with the conventional white-lens cap of camera.

##### Note 2:

No exact adjustment is made by the incident light except pattern-box to the white-balance box. It is desirable to make adjustment in a dark room, but if it is impossible, make adjustment after taking the following procedures.

1. Place the camera on black paper.  
(This procedure is necessary for the adjustment in a dark room.)
2. Approach the distance between camera and pattern box to less than 0.5m.
3. Cover a black paper on white-balance sensor for preventing the incident light except pattern box to the white-balance sensor.

##### [Connection]

Make the following connection for setting test-mode.

1. Connect W901 ⑥ pin with GND by jumper wire.
2. Confirm the position of white-balance SW (SW-71 board S941) at indoor " ".

##### [Adjustment Method]

- 1) Turn RV901, and confirm that CH1 takes 2 values of "L" (2.5Vdc) and "H" (2.7Vdc), also that CH2 takes 2 values of "L" (2.0Vdc) and "H" (2.6Vdc).
- 2) Turn RV901 slowly, and stop it when CH1 shows the position of "H" (2.7Vdc) and CH2 shows the position of "L" (2.0Vdc).

#### 7-4-28. Operation check for auto-following white balance

Subject	White pattern * Note
Filter	Filter C22 for correcting the colour temperature
Measurement point	Check on monitor-TV
Measurement equipment	

#### Note:

See the previous item, Note 2.

#### [Checking Method]

- 1) Set the white-balance SW to 'AUTO'-position. (SW-71 board 941)
- 2) By covering the camera with a black paper, prevent the incident light except pattern-box to white-balance sensor (AW-9 board SB901).
- 3) Confirm no-colour on the monitor-screen.
- 4) Cover the filter C22 for correcting the temperature compensation on white-balance sensor. (Prevent the other incident light than the filter by using a black paper.)
- 5) Confirm the orange-like colour of monitor-screen display. (The response needs 1 or 2 seconds.)
- 6) Return the position of SW to indoor "☉".

#### 7-4-29. Check for backlight compensation (VC-22 board)

Subject	Colour bar chart standard image frame
Measurement point	Pin ⑦ of FP-81 (CAM OUT)
Measurement equipment	Oscilloscope

#### [Checking Method]

- 1) Push the button for backlight compensation (SW-71 board S942).
- 2) Confirm that higher level of Y-signal induces higher chroma-level of "red" and "magenta" and "blue".
- 3) Confirm no-colour on white-part in monitor-TV screen.

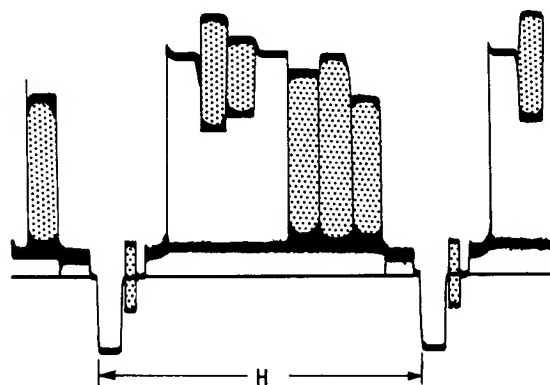


Fig. 7-39.



### 7.5. AUTO FOCUS SYSTEM ADJUSTMENT

Place sign chart in a position 2m from the lens standard picture as shown in Fig. 7-40. and perform adjustment. As to lighting, make the brightness (200 lux) so that "LOW LIGHT" is not displayed within the EVF.

Unless otherwise specified, perform adjustment by setting the focus switch (S945 on SW-71 board) in the position of "AUTO".

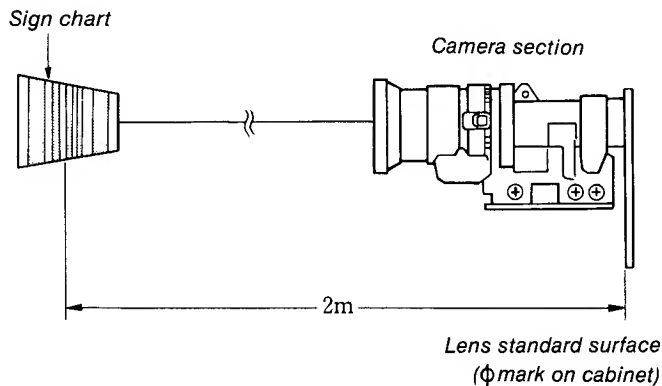


Fig. 7-40.

#### 7-5-1. AD Converter Standard Voltage Adjustment (AF-32 Board)

Subject	Arbitrary
Measurement Point	Both ends of VR1 (Refer to Fig. 7-42)
Measurement equipment	Digital voltmeter
Adjustment element	VR1
Specified value	$2.04 \pm 0.05\text{Vdc}$

##### [Adjustment Method]

- 1) Set focus switch (S945 on SW-71 board) to "auto" position.
- 2) Adjust to  $2.04 \pm 0.05\text{Vdc}$  with VR1.

#### AF-32 BOARD (Solder Side)

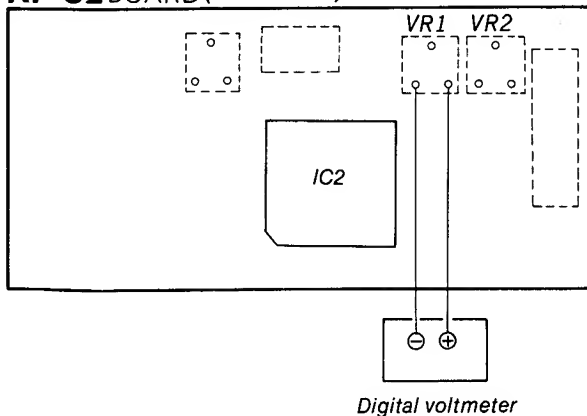


Fig. 7-41.

#### 7-5-2. $\bar{Xp}$ Adjustment (AF-32 Board)

Subject	Sign chart (Position of 2.0m forward of lens standard surface ( $\phi$ mark))
Measurement point	CH1: Pin ③ of CN2 CH2: Pin ④ of CN2
Measurement equipment	Oscilloscope (DC range)
Adjustment element	VR2
Specified value	Pulse should be output alternately from CH1 and CH2

##### [Connection]

- 1) Connect ALIGNMENT land (Pin ④) of IC2 and GND for an instant and set to adjustment mode. (Refer to Fig. 7-42.)

**Note:** When the focus switch (S945 on SW-71 board) is once set to the "manual" position and then set to the "auto" position, it returns to its original position.

#### AF-32 BOARD (Component Side)

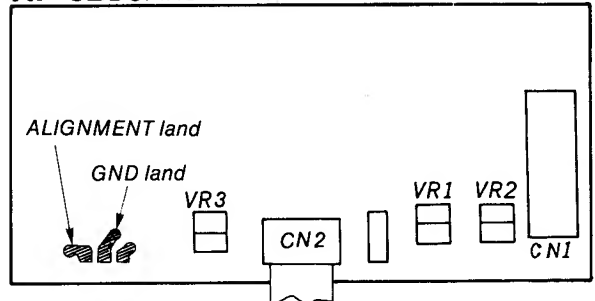


Fig. 7-42.

##### [Setting of switches]

- 1) Focus switch (S945 on SW-71 board) . . . Auto
- 2) Zoom lever . . . In the vicinity of 40mm

##### [Adjustment Method]

- 1) Turn focus ring and set focus indicator to the center of "2".
- 2) Set with VR2 so that the pulse is output alternately from CH1 and CH2.

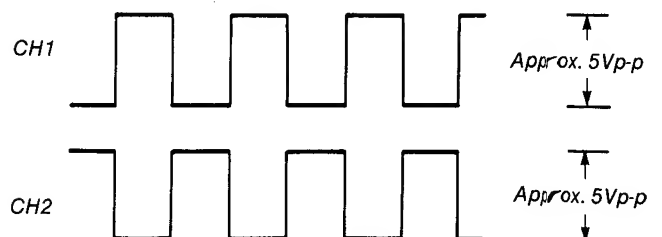


Fig. 7-43.

### 7-5-3. Z axis Adjustment

Subject	Sign chart (Position of 2.0m forward of lens standard surface (Φ mark))
Specified value	TELE side: $\pm 1.3\text{mm}$ WIDE side: $\pm 10\text{mm}$

#### [Adjustment Method]

- 1) Set focus switch (S945 on SW-71 board) to "auto" position.
- 2) By referring 7-5-2, set to adjustment mode.
- 3) Set zoom lever to TELE end (72mm).
- 4) Loosen Z frame securing screw ❶. (Fig. 7-45)
- 5) Move the Z frame forward and backward (A ↔ B direction) with the Z frame securing screw so that the focus ring stops at the center of indicator "2". (Figs. 7-44 and 7-45)
- 6) Tighten Z frame securing screw ❶. (Fig. 7-45)
- 7) Set zoom Lever to WIDE end (12mm).
- 8) Turn focus ring to the position of 1.2m.
- 9) Confirm that the stopping position of the indicator of focus ring is within range of  $\pm 10\text{mm}$  from the center of "2". (Fig. 7-44)
- 10) Turn focus ring to the position of  $\infty$ .
- 11) Confirm that the stopping position of the focus ring is within the same range.
- 12) If specified value is not satisfied, repeat steps 2) to 11).

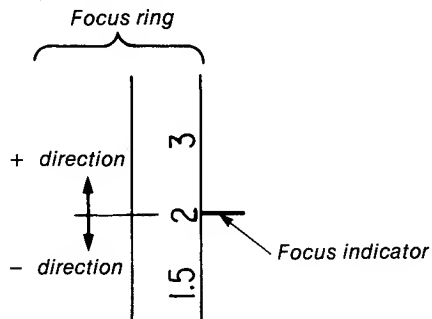


Fig. 7-44.

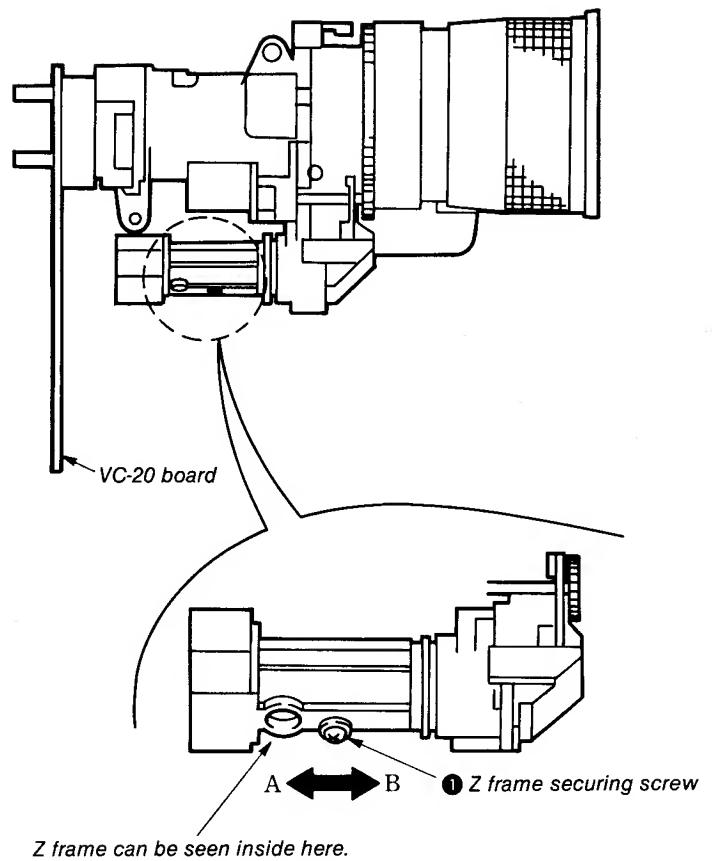


Fig. 7-45.

#### 7-5-4. Motor Voltage Adjustment (AF-32 Board)

Subject	Sign chart (Position of 0.9m forward of lens standard surface (Φ mark))
Measurement equipment	Stop watch
Adjustment element	VR3
Specified value	$2.5 \pm 0.5$ seconds

##### Setting of switches

- 1) Focus switch (S945 on SW-71 board) . . . MANUAL
- 2) Zoom lever . . . In the vicinity of 20mm

##### [Adjustment Method]

- 1) Set focus ring to infinity bar end ( $\infty$  side).
- 2) Press the "pressing auto" button (S945 on SW-71 board).
- 3) Measure the time from the moment "pressing auto" button is pressed and focus ring rotates, to the moment it reaches short-distance end.
- 4) If the specified value is not satisfied, turn VR3 and repeat steps 1) to 3).

#### 7-5-5. Auto Focus Confirmation

Subject	Sign chart (Position of 2.0m forward of lens standard surface (Φ mark))
Specified value	TELE side: within $\pm 1.5$ mm against just focus point during manual WIDE side: within $\pm 15$ mm against just focus point of TELE

##### [Confirmation Method]

- 1) Set the focus switch (S945 on SW-71 board) to the position of "manual".
- 2) Set the zoom lever to TELE end (72mm).
- 3) Turn focus ring so that it becomes into focus. Confirm at this time that the focus indicator is within the specified position as shown in Fig. 7-46. In addition, memorize the position of the focus indicator. (If the specifications are not satisfied, perform flange back adjustment.)

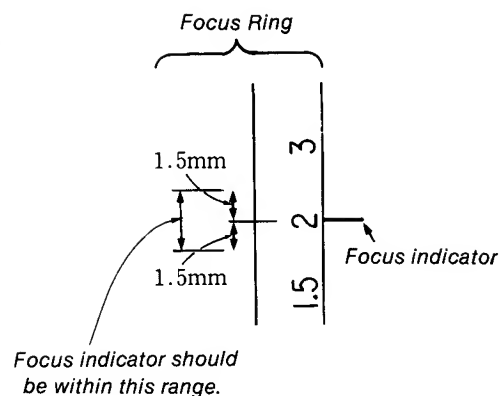


Fig. 7-46.

- 4) Set the focus switch to the "auto" position.
- 5) By referring 7-5-2, set to adjustment mode.
- 6) Turn the focus ring to the position of  $\infty$ .
- 7) Confirm that the stopping position of the focus ring is within  $\pm 1.5$ mm against the in-focus position (position of focus indicator memorized in step 3).
- 8) Turn focus ring to the position of 1.2m.
- 9) Confirm that the stopping position of the focus ring is within  $\pm 1.5$ mm against the position of in-focus during manual.
- 10) Secure zoom lever to WIDE end (12mm).
- 11) Repeat steps 6) to 8). However, the in-focus specifications of WIDE end should be within  $\pm 15$ mm against in-focus of TELE side.

## 7-6. DIGITAL DISPLAY/DIGITAL TITLER BLOCK ADJUSTMENT

### 7-6-1. Clock Precision Adjustment (DS-24 Board)

Mode	CAMERA POWER OFF, INstall the lithium battery
Subject	Arbitrary
Measurement point	Pin ④① of IC108
Measurement instrument	Frequency counter
Adjustment element	CT101
Specified value	$8192 \pm 0.05\text{Hz}$

#### [Connection]

Connect Pin ③⑥ of IC108 ( $\overline{\text{TEST}}$ ) and GND with jumper wire and set to test mode.

#### [Adjustment Method]

- 1) Adjust to  $8192 \pm 0.05\text{Hz}$  with CT101.

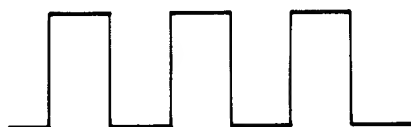


Fig. 7-47.

### 7-6-2. AD Converter Level Adjustment (DS-24 Board)

Mode	Camera standby
Subject	All black (Cover lens with black cap)
Measurement point	⊕ probe: Pin ② of IC104 ⊖ probe: Pin ③ of IC104
Measurement equipment	Digital voltmeter
Adjustment element	RV102
Specified value	$+0.35 \pm 0.01\text{Vdc}$

#### [Adjustment Method]

Adjust to  $0.35 \pm 0.01\text{Vdc}$  with RV102.

### 7-6-3. Chroma Blanking Level Adjustment (DS-24 Board)

Mode	Camera standby
Subject	All black (Cover lens with black cap)
Measuring point	Image output terminal
Adjusting element	Oscilloscope
Adjusting element	RV101
Specified value	Colour should not appear at superimposed section.

#### [Adjustment Method]

- 1) After removing battery (or AC pack) from the grip section, insert again.

- 2) Set to camera standby mode.
- 3) Press "MEMORY" button (S948 on SK-21 board) and memorize "all black".
- 4) Minimize 3.58MHz component with RV101.

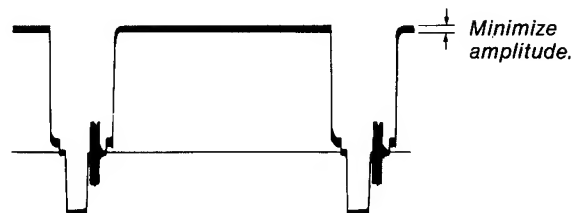


Fig. 7-48.

### 7-6-4. Digital-Title Clock Adjustment (DS-24 Board)

Mode	Camera standby
Subject	All black (Cover lens with black cap)
Measurement point	Image output terminal
Measurement equipment	Oscilloscope
Adjusting element	CT103
Specified value	$1.5 \pm 0.1\mu\text{sec}$

#### [Adjustment Method]

- 1) Press "MEMORY" button (S948 on SK-21 board) and memorize "all black".
- 2) Press "COLOR" button (S949 on SK-21 board) and make so that "white" in superimposed.
- 3) Adjust to  $1.5 \pm 0.1\mu\text{sec}$  with CT103.

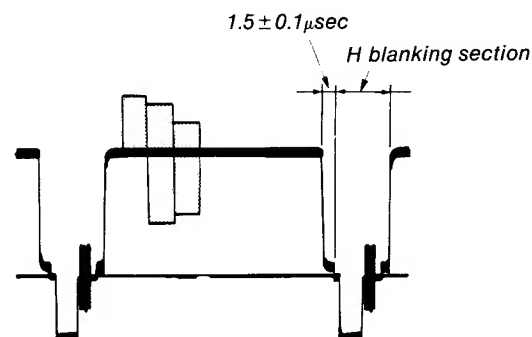


Fig. 7-49.

The diagram shows the TP802 control panel with the following components and connections:

- TP802**: Located at the top center of the panel.
- COLOUR REPRODUCIBILITY**: A label with an arrow pointing to the **RV803** knob.
- CARRIER BALANCE**: A label with an arrow pointing to the **RV803** knob.
- CHROMA GAIN**: A label with an arrow pointing to the **RV808** knob.
- Y LEVEL**: A label with an arrow pointing to the **RV809** knob.
- BURST LEVEL**: A label with an arrow pointing to the **RV805** knob.
- APERTURE**: A label with arrows pointing to the **RV802** and **RV801** knobs.
- COLOUR REPRODUCIBILITY**: A label with an arrow pointing to the **RV806** knob.
- HUE**: A label with an arrow pointing to the **RV806** knob.
- WHITE CLIP (2)**: A label with an arrow pointing to the **RV810** knob.
- TP801**: Located to the right of the panel, with an arrow pointing to the **Y (luminance)** label.
- Y (luminance)**: A label with an arrow pointing to the **RV810** knob.
- RV802, RV801, RV809, RV806, RV803, RV805, RV808, RV810**: Eight knobs arranged in two rows of four.
- IRIS SET**: A label with an arrow pointing to the **RV722** knob.
- AGC SET**: A label with an arrow pointing to the **RV721** knob.
- LLA**: A label with an arrow pointing to the **RV723** knob.
- RV722, RV721, RV723**: Three knobs located in a separate section at the bottom of the panel.
- 13, 9, 20, 1**: Terminal numbers located around the bottom section of the panel.





## SECTION 8 MECHANICAL ADJUSTMENT (VIDEO SECTION)

### 8-1. PREPARATION FOR CHECK, ADJUSTMENT AND REPLACEMENT OF THE MECHANICAL SECTIONS

With regard to removal of the cabinet, board, etc. see  
“SECTION 2 DISASSEMBLY”

Adjustment of mechanism section is performed in the  
EJECT state. (In order to make into EJECT state, refer to  
“8-1-5, Handling of Mode Selector.”)

#### 8-1-1. Cassette Arm Assembly (See Fig. 8-1)

##### 1. Removal

- 1) Remove screws ①, ②, ③ and ④.
- 2) Remove cassette arm assembly ⑤.

##### 2. Installation

- 1) Install cassette arm assembly ⑤ to the main body so that  
the two positions of pins ⑥ enter the predetermined  
positions.
- 2) Put the dowel ⑧ of the frame assembly into the reference  
hole ⑦ of the cassette arm, and tighten the screws ① and  
② in that order.
- 3) Install screw ③ loosely and tighten in the order of screw  
④ and screw ③.

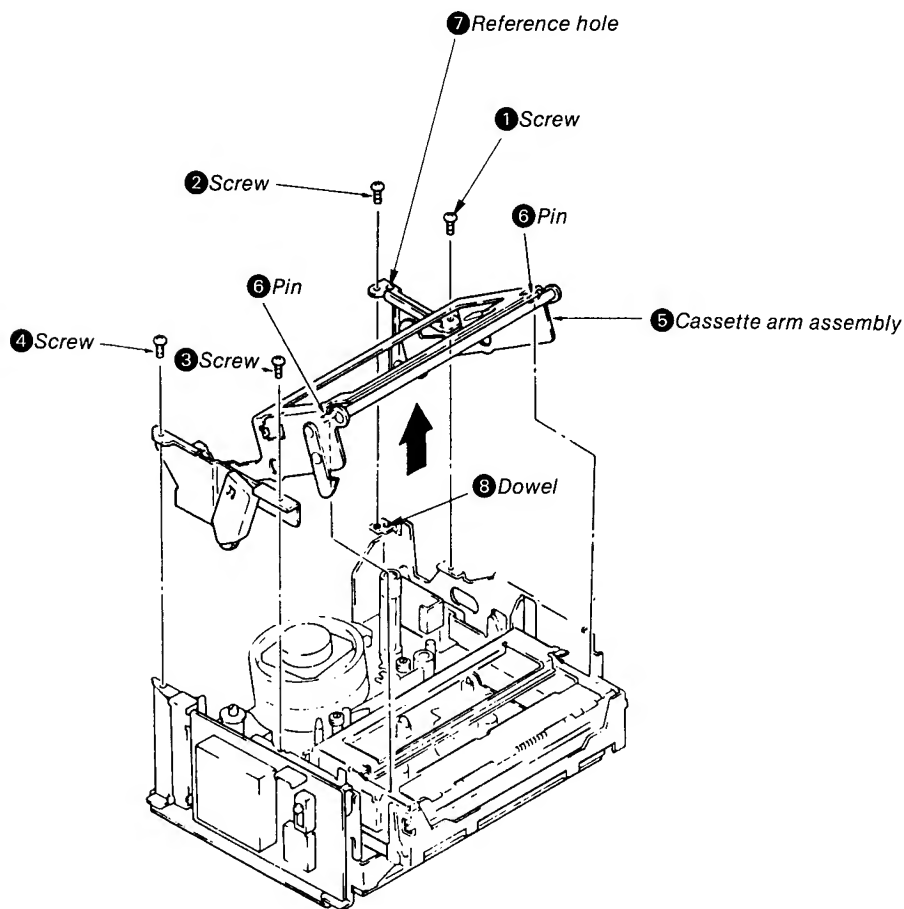


Fig. 8-1.

### 8-1-2. LS cassette Compartment Assembly (See Fig. 8-2)

#### 1. Removal

- 1) Remove screws ①, ②, ③ and ④.
- 2) Push two positions of the slot ⑧ of LS frame ⑥ in the direction of arrow A, and remove two positions of pin ⑤ and ⑨. (Since the pin (C) ⑤ is longer, remove the pin (B) ⑨ first.)
- 3) Remove LS cassette compartment assembly ⑦.

#### 2. Installation

- 1) Install LS cassette compartment assembly ⑦ to the main body.
- 2) Push the two positions of slot ⑧ of LS frame in the direction of arrow A, and insert pins ⑤ and ⑨ at two positions. (Since the pin (C) ⑤ is longer, insert this pin first.)
- 3) Install screws ③ and ④ loosely and tighten in the order of screws ①, ②, ③ and ④.

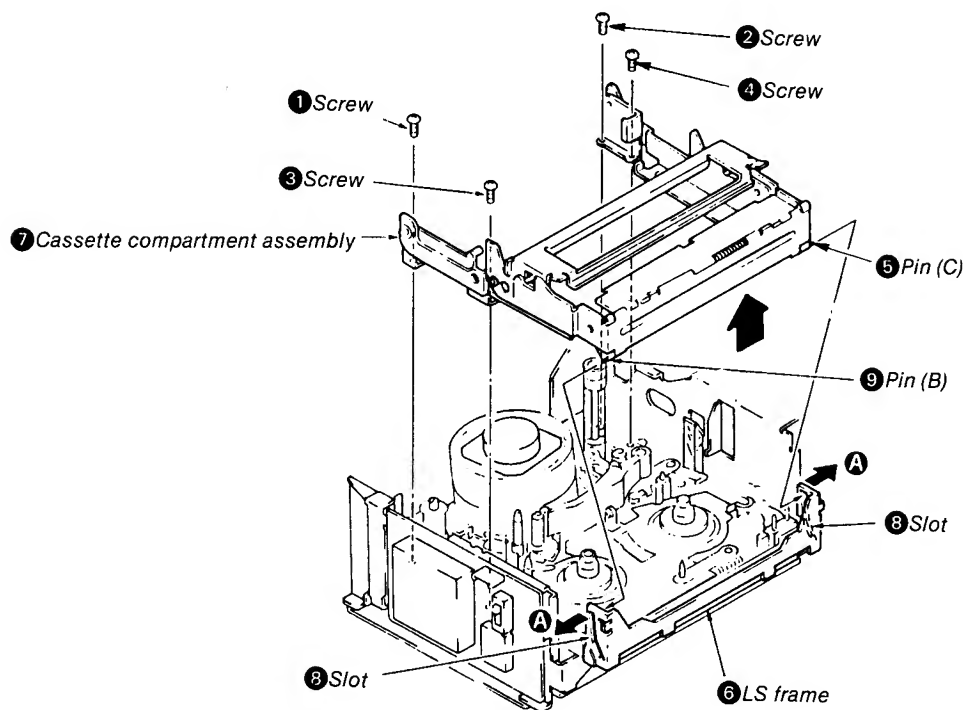


Fig. 8-2.

### 8-1-3. Extracting Method with the Cassette Loading End State

- 1) By referring, Section 2 Disassembly 2-6, set SS-70 board up to be able to open.
- 2) By referring 8-1-5, connect the mode selector.

**Note:**

The mode indicated by    is set by pushing the buttons of the mode selector.

- 3) Set up GUIDE LOAD mode, and move each tape guide from the position shown in Fig. 8-4 to the position shown in Fig. 8-5.
- 4) Open SS-70 board ① and wind up tape into cassette by rotating the rotor ② in the direction of arrow. (See Fig. 8-3)

**Note:**

Though in GUIDE LOAD mode, cannot wind up tape when each guide is not positioned as shown in Fig. 8-5, close to the cassette.

- 5) Be sure to wind up tape completely, and set up EJECT mode, then take out the cassette.

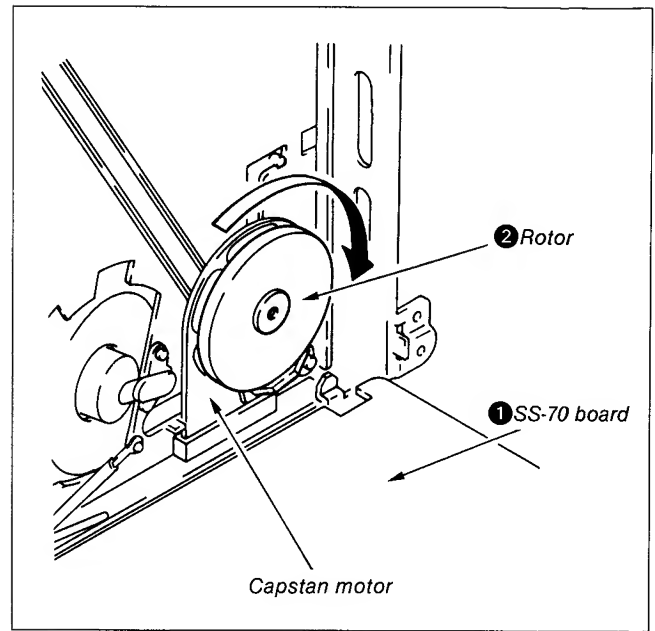


Fig. 8-3

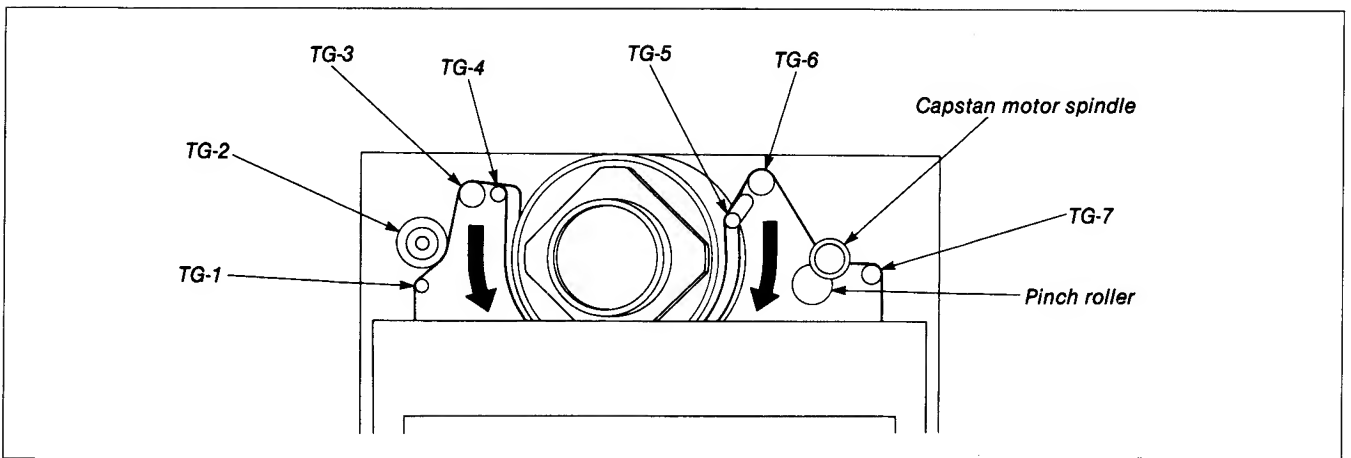


Fig. 8-4.

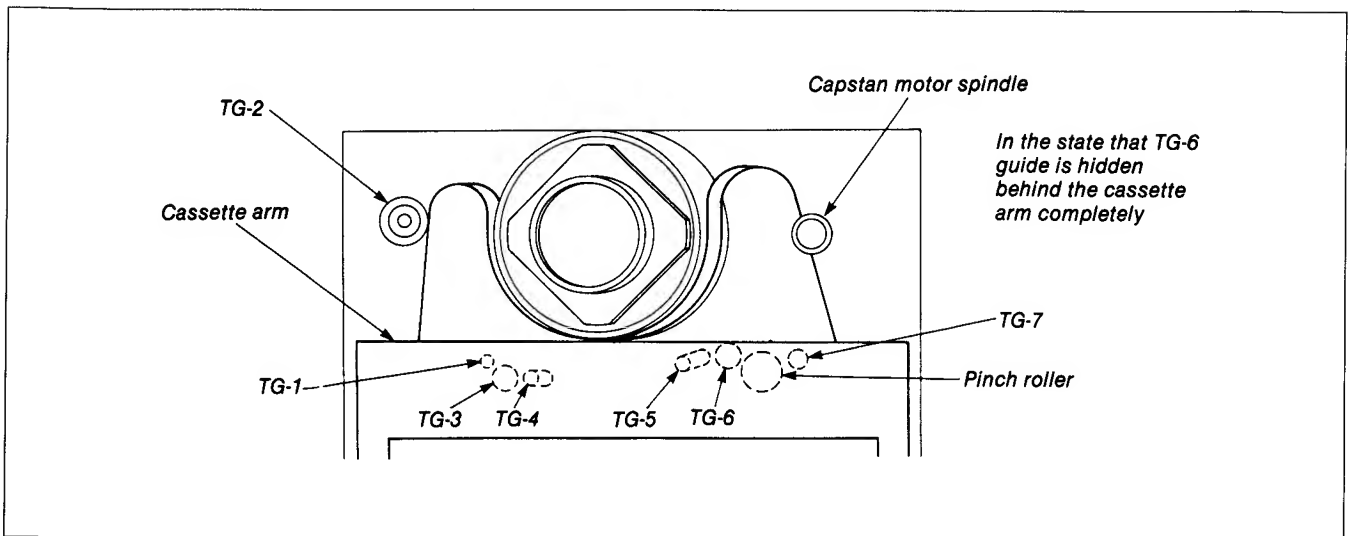


Fig. 8-5.

#### 8-1-4. Cassette and Cassette Arm Assembly, and a Method to Operate the Set in the State of the LS Cassette Compartment Assembly being Removed

**Note:** The set may not operate if there is an intense light source near the set.

##### 1. Method to load a cassette. (See Fig. 2-6.)

- 1) Set the battery pack on the battery holder assembly ①.
- 2) Set the battery holder assembly ① into the cabinet (L) ②.
- 3) Set the connector ③ which comes out from the cabinet (L) ② to pin ④ of CN205 on the MV-12 board.

4) Cover the LED assembly.

5) Maintain the state in which the pin of push SW ⑦ is being depressed (ON state) and secure it with adhesive tape ⑧.

6) When pushing the return prevention arm ⑨ is pushed into the direction of arrow A, the set becomes into the loading state.

##### 2. Method to set into the REC state

- 1) When step 1 has been completed, set power supply switch ⑩ on the SK-19 board to the camera position.

##### 3. Method to EJECT

- 1) Turn ON the EJECT SW ⑪.

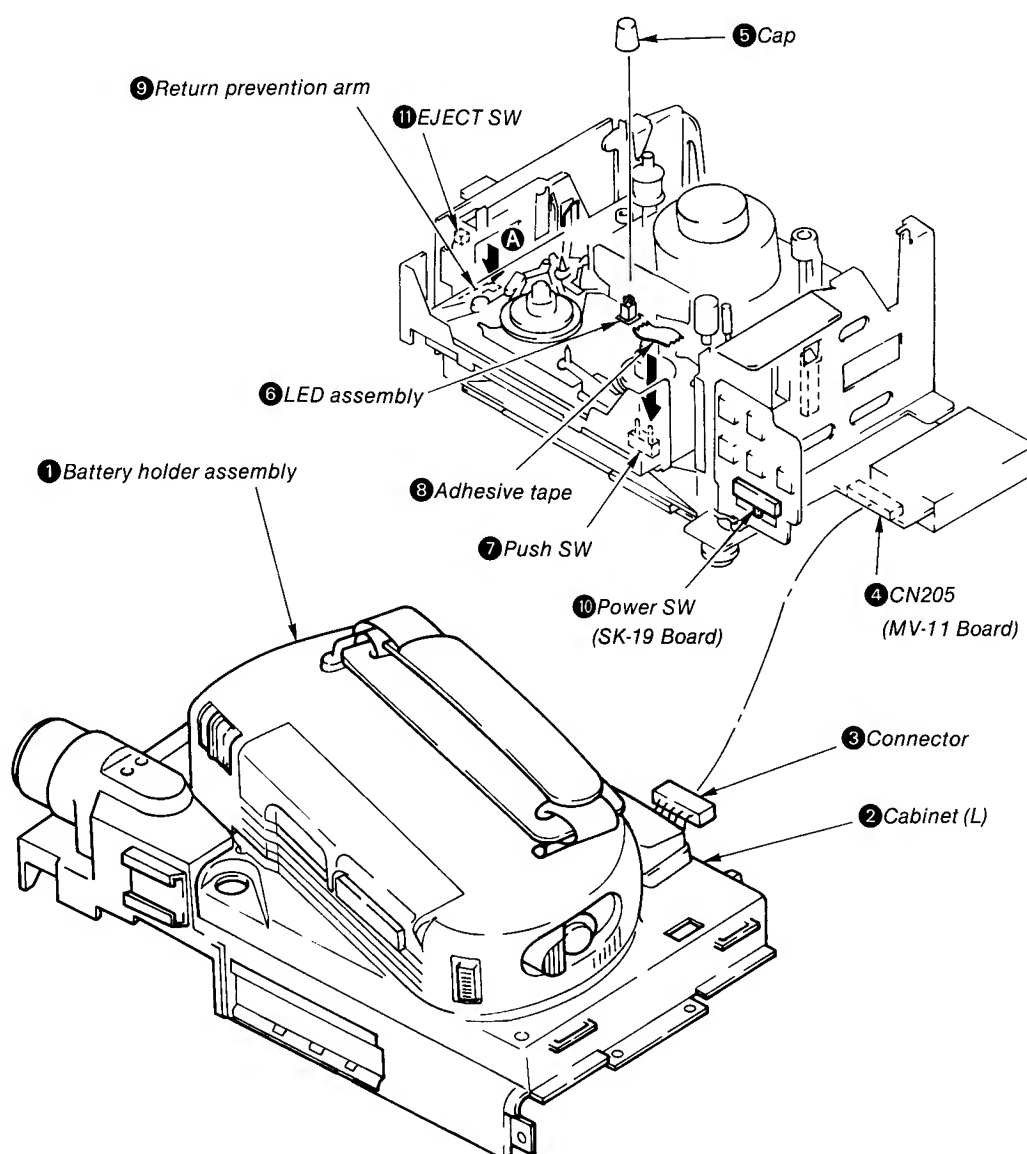


Fig. 8-6.

### 8-1-5. Handling of Mode Selector

•Install mode selector II panel (See Fig. 8-7)

#### 1. Name of each section (See Fig. 8-8)

#### 2. Connection (See Fig. 8-9.)

- 1) Remove connector of FP-47 flexible board with a flat-blade screwdriver, etc.
- 2) Insert mode selector II conversion II conversion connector.
- 3) Insert M-SW connector into mode selector II conversion connector.

#### 3. Handling

- 1) Use only M mode selection button.
- 2) When selecting, if not in individual modes, "BLANK" is lit.
- 3) When right side of M mode selection button is pressed continuously, the lamps are lit in th order of EJECT → USE ← GUIDE LOAD → REC → READY.
- 4) When rendering into READY → EJECT, press the selection button on th left side to obtain the objective mode.

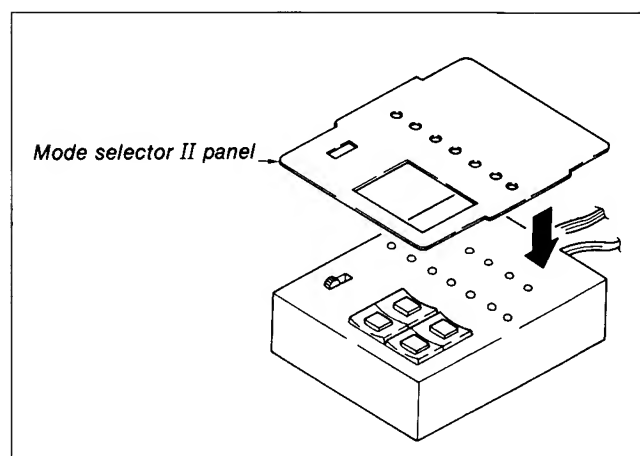


Fig. 8-7.

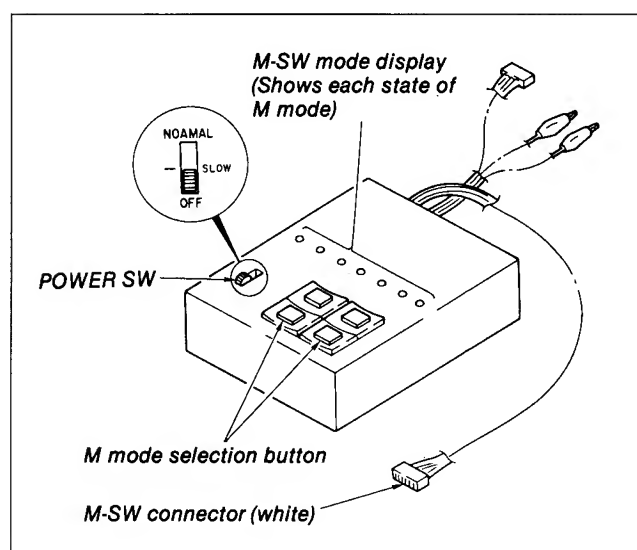


Fig. 8-8.

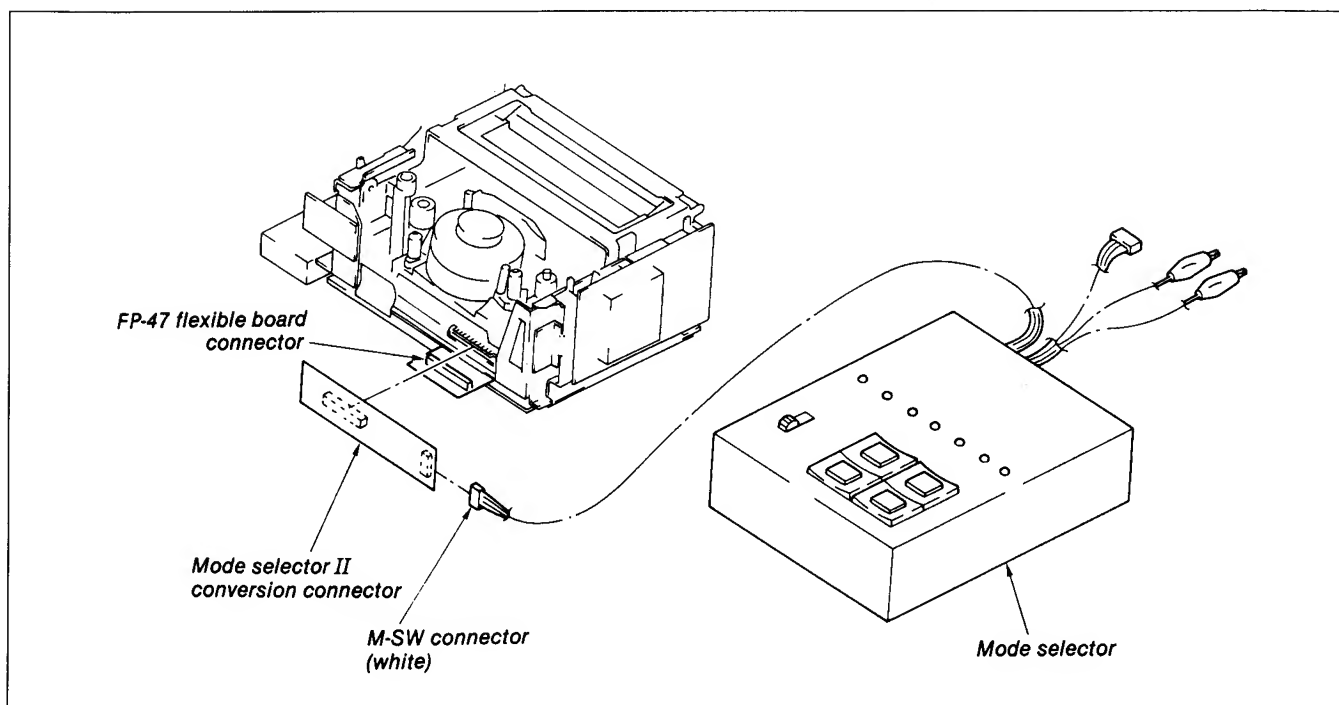


Fig. 8-9.

[illegible]

Ref. No	Part No.	Description	Ref. No	Part No.	Description
CAPACITOR			IC		
C1	1-108-579-00	MILER 0.01 $\mu$ F 50V	IC1	8-759-240-28	IC TC4028BP
C2	1-123-333-00	ELECT 100 $\mu$ F 24V	IC2	8-759-120-03	IC $\mu$ PA2003C
C3	1-108-579-00	MILER 0.01 $\mu$ F 50V	IC3	8-759-240-28	IC TC4028BP
C4	1-123-333-00	ELECT 100 $\mu$ F 24V	IC4	8-759-120-03	IC $\mu$ PA2003C
C101	1-108-579-00	MILER 0.01 $\mu$ F 50V			
C102	1-123-333-00	ELECT 100 $\mu$ F 24V			
C103	1-108-579-00	MILER 0.01 $\mu$ F 50V			
DIODE			RESISTOR		
D1	8-719-812-31	DIODE TLR123	R1	1-247-179-00	CARBON 100K 1/4W
D2	8-719-812-31	DIODE TLR123	R2	1-247-179-00	CARBON 100K 1/4W
D3	8-719-812-31	DIODE TLR123	R3	1-247-179-00	CARBON 100K 1/4W
D4	8-719-812-31	DIODE TLR123	R4	1-247-131-00	CARBON 1K 1/4W
D5	8-719-812-31	DIODE TLR123	R5	1-247-121-00	CARBON 390 1/4W
D6	8-719-812-33	DIODE TLG123A	R6	1-247-131-00	CARBON 1K 1/4W
D7	8-719-812-31	DIODE TLR123	R7	1-247-179-00	CARBON 100K 1/4W
D8	8-719-812-31	DIODE TLR123	R8	1-247-179-00	CARBON 100K 1/4W
D9	8-719-812-31	DIODE TLR123	R9	1-247-179-00	CARBON 100K 1/4W
D10	8-719-812-31	DIODE TLR123	R10	1-247-121-00	CARBON 390 1/4W
D11	8-719-812-31	DIODE TLR123	R901	1-214-594-00	METAL FILM 10 1W
D12	8-719-812-31	DIODE TLR123			
D13	8-719-812-33	DIODE TLG123A			



## 8-2. PERIODIC CHECK AND MAINTENANCE

- In order to fully exhibit the functions and performance of the set, carry out the following maintenance and periodic checks for the equipment and tape. In addition, after repair, carry out the following itemized maintenance irrespective of the user's length of time of usage.

### 8-2-1. Cleaning of Rotary Drum Assembly

- 1) Press a chamois cloth (Ref. No.J-2) soaked in cleaning fluid (Ref. No.J-1) lightly against the rotary drum assembly, and slowly rotate the rotary upper drum assembly counter-clockwise by hand to clean.

**Note:**

Do not use the power supply to rotate the motor, and do not rotate the drum clockwise by hand. Also, there is the danger of damaging the head tip if the chamois cloth is moved vertically relative to the head tip, so follow the instruction above for cleaning.

### 8-2-2. Cleaning of Tape Path (See Fig. 8-10.)

- 1) Place the cassette compartment assembly in the EJECT state, and clean the tape path (TG-1, 2, 3, 4, 5, 6 and 7, pinch roller, and capstan shaft) with a chamois cloth soaked in cleaning fluid.

**Note:**

Be careful lest the chamois cloth should be stained with oil or grease of each link mechanism.

### 8-2-3. Cleaning of Drive System

- 1) Clean the drive system (relay belt and surface of reel tables) with a chamois cloth soaked in cleaning fluid.

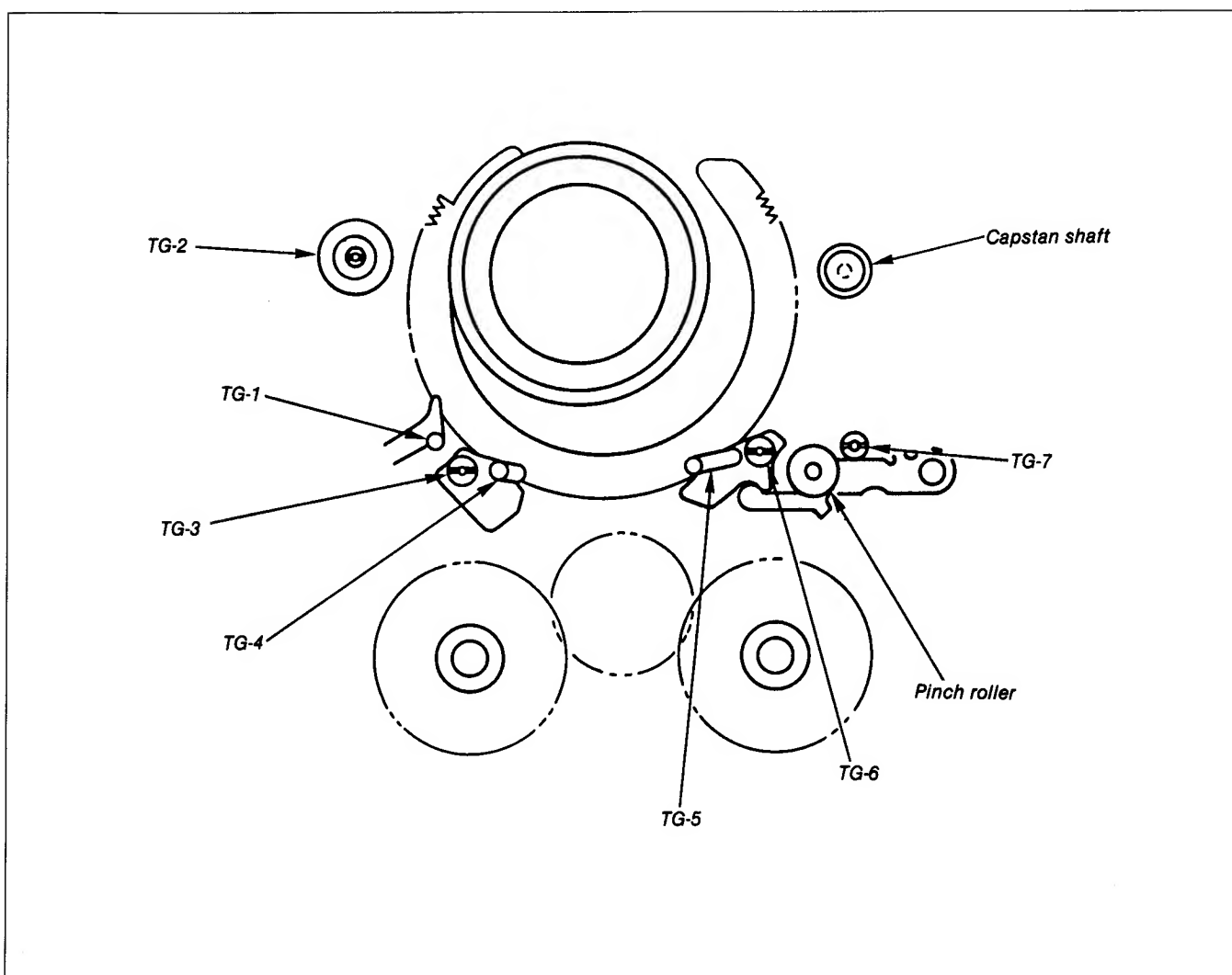


Fig. 8-10.

#### 8-2-4. Periodic Check

Location of Maintenance and check		Hours of Use (H)										Remarks
		500	1000	1500	2000	2500	3000	3500	4000	4500	5000	
	Cleaning of tape path surface	○	○	○	○	○	○	○	○	○	○	Be careful of oil
	Cleaning and degaussing of rotary assembly	○	○	○	○	○	○	○	○	○	○	Be careful of oil
	Relay belt	—	☆	—	☆	—	☆	—	☆	—	☆	3-695-637-01
	Capstan shaft	—	●	—	●	—	●	—	●	—	●	Be absolutely careful not to get oil on the tape path surface.
	Relay pulley shaft	—	●	—	●	—	●	—	●	—	●	
	Loading motor	—	☆	—	☆	—	☆	—	☆	—	☆	1-541-508-11
	Abnormal noise	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	
	Back tension measurement	—	☆	—	☆	—	☆	—	☆	—	☆	
	Brake system	—	☆	—	☆	—	☆	—	☆	—	☆	
	FWD. RVS torque measurement	—	☆	—	☆	—	☆	—	☆	—	☆	

○: Cleaning    ●: Oil    ☆: Confirmation

**Tape Trans-  
Portion System**

**Driving System**

**Performance  
Confirmation**

#### Notes:

- 1) When performing overhaul, refer to the items above when replacing parts.
- 2) Oil
  - Be sure to use a oil authorized. (There is the danger of various troubles occurring if a different viscosity is used.)  
Oil: Parts No. 7-661-018-18 (MITSUBISHI Diamond Oil NT-68)
  - Be absolutely sure to use clean oil without any mixture of dust, etc. when lubricating the shaft bearing. (There is the danger of wear and burning if dirty oil is used with a mixture of dust, etc.)
  - One drop of oil means the amount which sticks to a 2mm diameter rod, as shown in figure. (See Fig. 8-11)

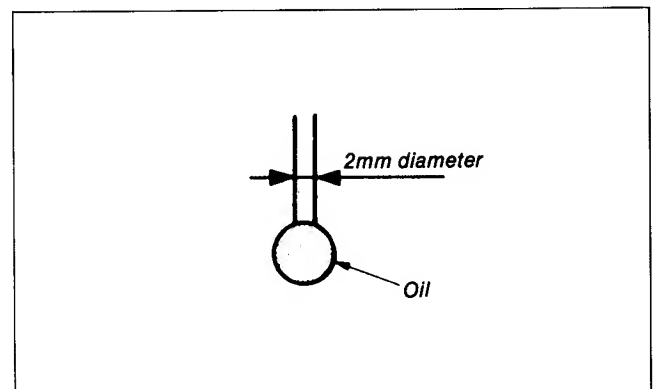

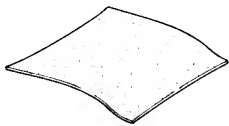
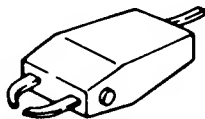
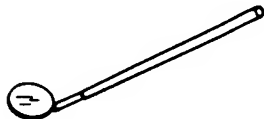
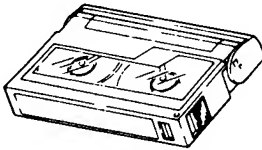
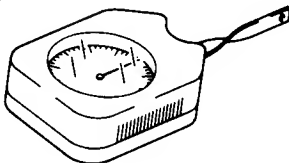
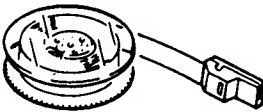

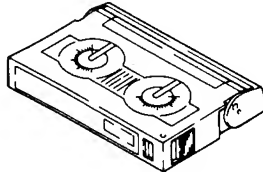

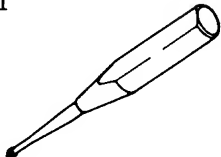
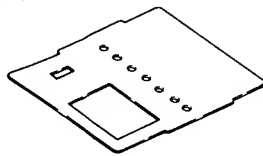
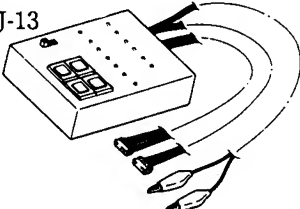
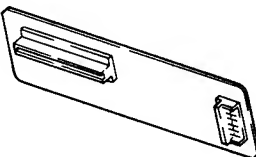



Fig. 8-11.

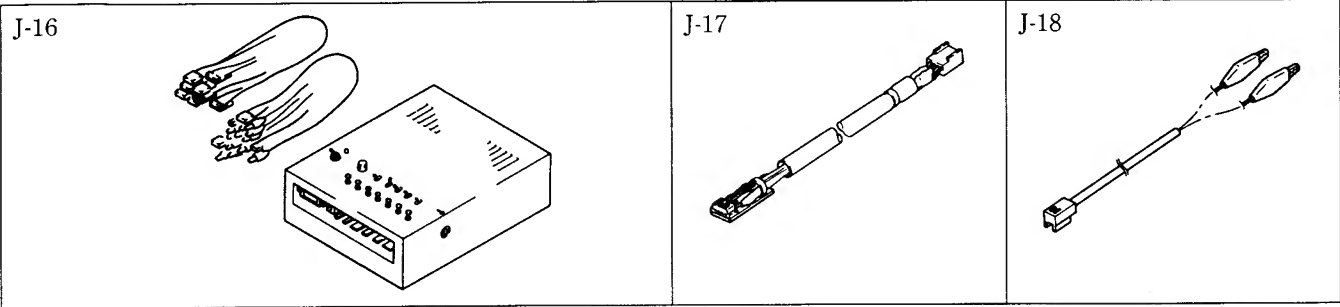
## 8-2-5. Service Jig Table

Ref No.	Name	Part No.	Fixture No.	Usage and Others
J-1	Cleaning fluid	Y-2031-001-0		
J-2	Chamois cloth	2-034-697-00		
J-3	Head degausser	Widely available		
J-4	Small mirror for adjustment Spare mirror	J-6080-029-A J-6080-030-1	SL5052	Tape path
J-5	Alignment tape (WR5-1C)	8-967-995-06		Tape path
J-6	Dial tension gauge	J-6080-827-A		Various torque measurement
J-7	Tension measurement reel	J-6080-831-A		With $\phi 30$ tape
J-8	Tension measurement reel	J-6080-832-A		With $\phi 16$ string
J-9	FWD and RVS winding torque cassette	J-6080-624-A	GD-2086	
J-10	Rotary drum jig	(Packed with the repair rotary upper drum)		
J-11	Screwdriver for tape path	J-6080-811-A		For tape guide adjustment
J-12	Mode selector II panel	J-6080-844-A		
J-13	Mode selector	J-6080-825-A		For all models
J-14	Mode selector II conversion connector	J-6080-845-A		
J-15	Tape end detecting filter	J-6080-848-A		Tape end detecting adjustment

Other equipment ● Oscilloscope  
● Analog tester (20k $\Omega$ )

J-1 	J-2 	J-3 	J-4 
J-5 	J-6 	J-7 	J-8 
J-9 	J-10  (Packed with the repair rotary upper drum.)	J-11 	
J-12 	J-13 	J-14 	J-15 

Ref No.	Name	Part No.	Usage and Others
J-16	TRACK SHIFT & MONITOR JIG	J-6080-843-A	Tape path
J-17	RF/SWP connector	J-6080-843-2	TRACK SHIFT & MONITOR JIG connection cable
	CTL connector	J-6080-843-2	
J-18	POWER SUPPLY connector	J-6080-843-1	



### 8-3. MECHANICAL CHECK, ADJUSTMENT AND REPLACEMENT

#### Note:

- Use the mode selector (Ref. No. J-13) for this mechanical check, adjustment and replacement.
- The mode inside the ☐ is the mode set by pressing the mode selector button.

#### 2. Installation

- 1) Install reel lock lever assembly ④ to shaft ⑤ and fixed it to stopper washer ③.
- 2) Hook the tension coil spring ① to notch ②.
- 3) By referring to 8-1-1 and 8-1-2, install the cassette arm assembly and LS cassette compartment.

#### 8-3-1. Reel Lock Lever Assembly (See Fig. 8-12)

##### 1. Removal

- 1) By referring to 8-1-1 and 8-1-2, remove cassette arm assembly and LS cassette compartment assembly.
- 2) Remove tension spring ① from notch ②.
- 3) Remove stopper washer ③ and remove reel lock lever assembly ④ from claw ③ and shaft ⑤.

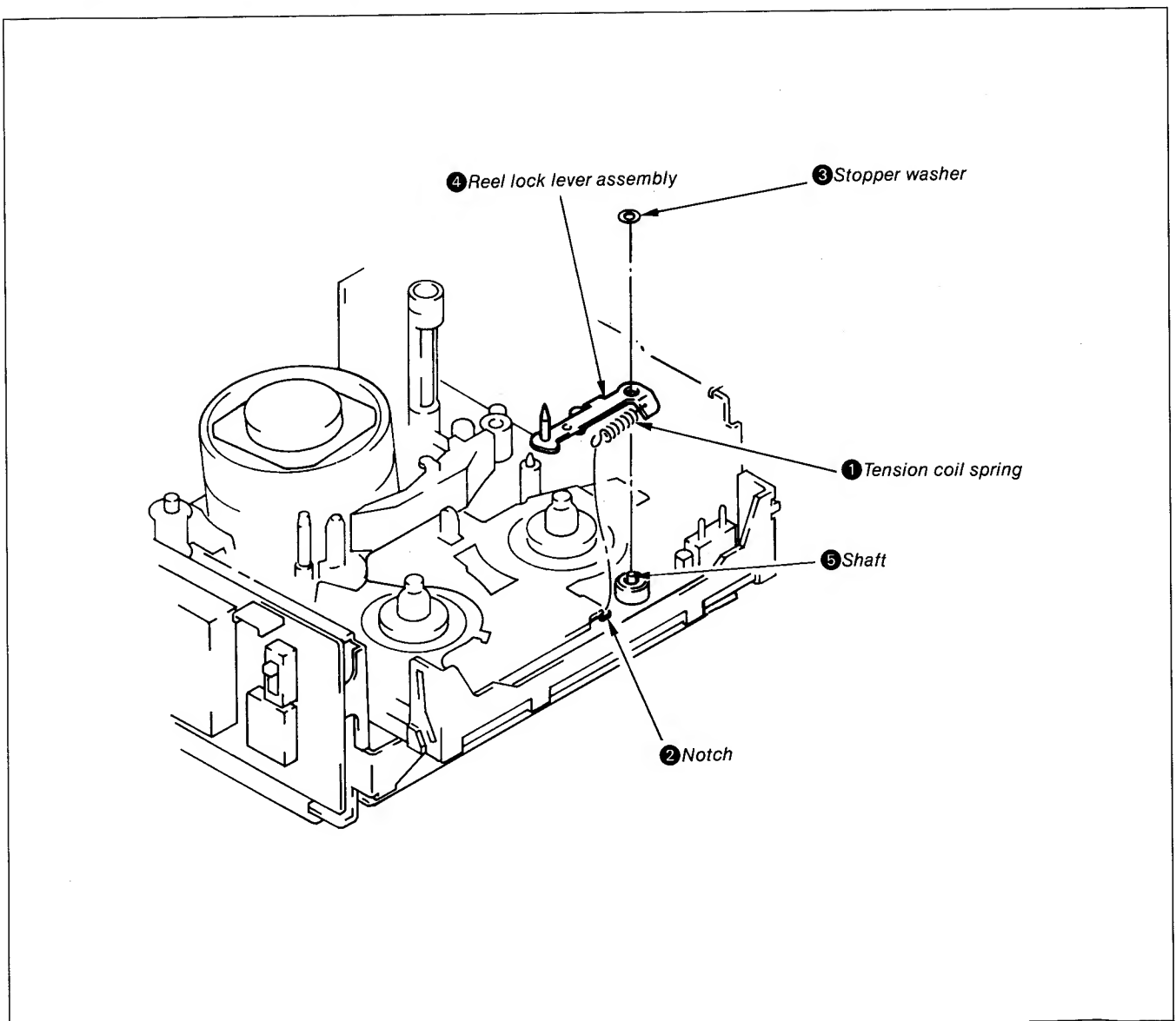


Fig. 8-12.

### 8-3-2 Pendulum Stopper Plate (See Fig. 8-13.)

#### 1. Removal

- 1) By referring to 8-1-1 and 8-1-2, remove the cassette arm assembly and LS cassette compartment assembly.
- 2) By referring to 8-3-1, remove reel lock lever assembly.
- 3) Pushing the claw 7 of the LED assembly 1 in the direction of arrow A, lift and remove the LED assembly 1, and then, remove the claw 2.
- 4) Remove two screws 3 and 4.
- 5) Remove pendulum stopper plate 6 from the two positions of claws 5.

#### Note:

Since the claw 7 is easily deformed or broken by too strong pushing force, mount and dismount carefully.

#### 2. Installation

- 1) Set in **READY** mode.

- 2) See to it that the LED assembly 1 is mounted on the pendulum stopper plate 6 and fasten to two positions of the claw 5 and two positions of the dowels 9.
- 3) Install two screws 3 and 4.
- 4) Hook claw 2 of LED assembly 1 and insert by pushing in the direction of arrow B.
- 5) Set to **EJECT** mode.
- 6) By referring to 8-3-1, install the reel lock lever assembly.
- 7) By referring to 8-1-1 and 8-1-2, install the cassette arm assembly and LS cassette compartment assembly.

#### Note:

- Caution should be taken that the TG-1 band assembly 8 is not clasped in when installing the pendulum stopper plate 6.
- In other modes than **READY**, the band becomes loose.

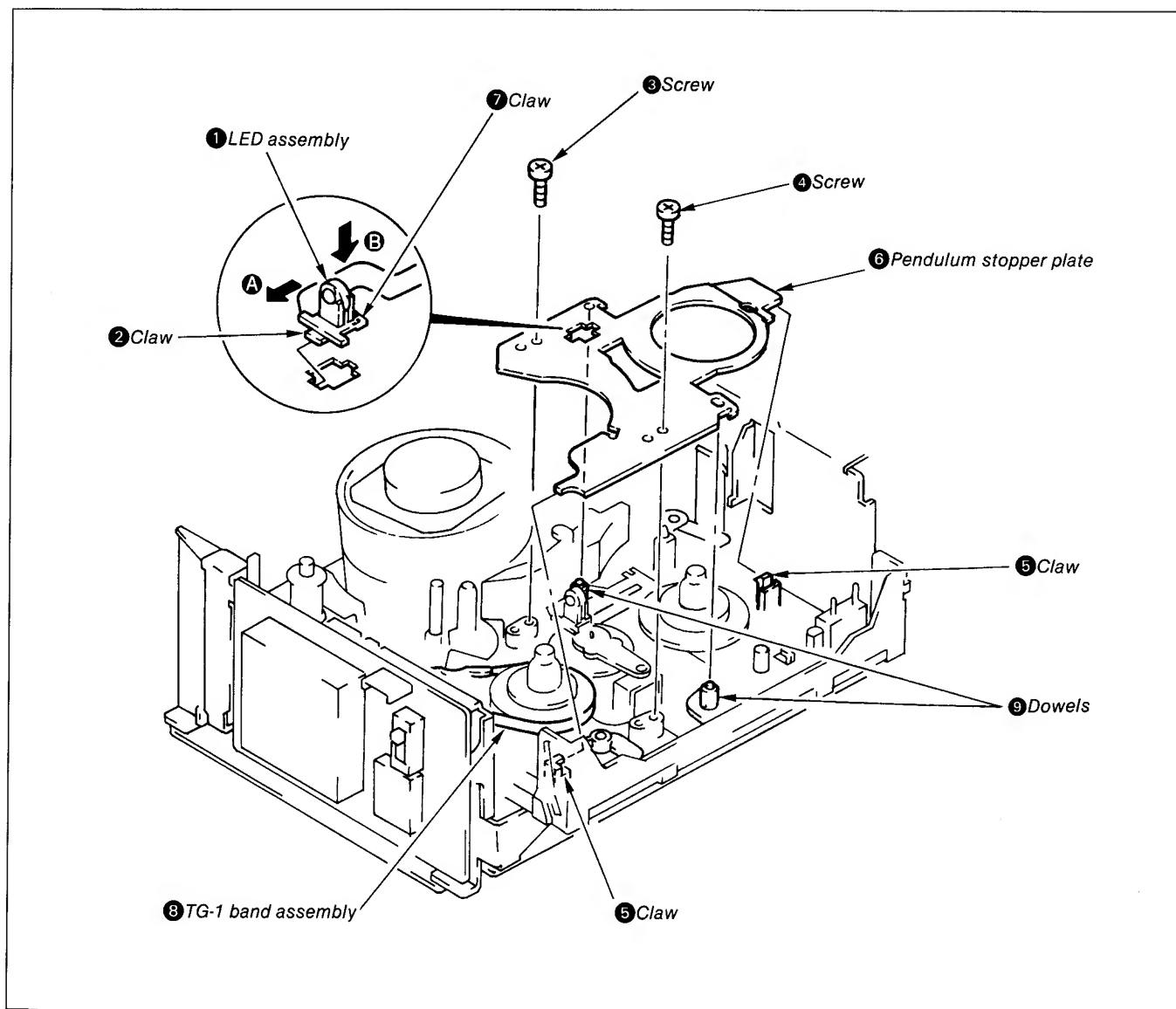


Fig. 8-13.



### 8-3-3. S Reel Table Assembly (See Fig. 8-14)

#### 1. Removal

- 1) By referring to 8-1-1 and 8-1-2, remove cassette arm assembly and LS cassette compartment assembly.
- 2) By referring to 8-3-1, remove reel lock lever assembly.
- 3) By referring to 8-3-2, remove pendulum stopper plate.
- 4) Remove screw ①, and remove one side of TG-1 band assembly ②.
- 5) Move the soft brake ③ in the direction of arrow A.
- 6) Remove S reel table assembly ④.

#### Note:

Perform removal of S reel table assembly ④ by holding the \* marked section of reel claw.

#### 2. Installation

- 1) Apply over 1/3 drop and below 1/2 drop of oil to the arrow section of shaft ⑤ as in Fig. A.
- 2) Move soft brake ③ in the direction of arrow A.
- 3) Install S reel table assembly ④ to the shaft.
- 4) Install screw ① to TG-1 band assembly ②.
- 5) By referring to 8-3-2, install pendulum stopper plate.
- 6) By referring to 8-3-1, install reel lock lever assembly.
- 7) By referring to 8-1-1, install cassette arm assembly and LS cassette compartment assembly.

#### Note:

- 1) By referring to 8-3-26, perform check of reel table height.
- 2) By referring to 8-3-28, perform position adjustment of tension regulator.
- 3) By referring to 8-3-29, perform adjustment of back tension.

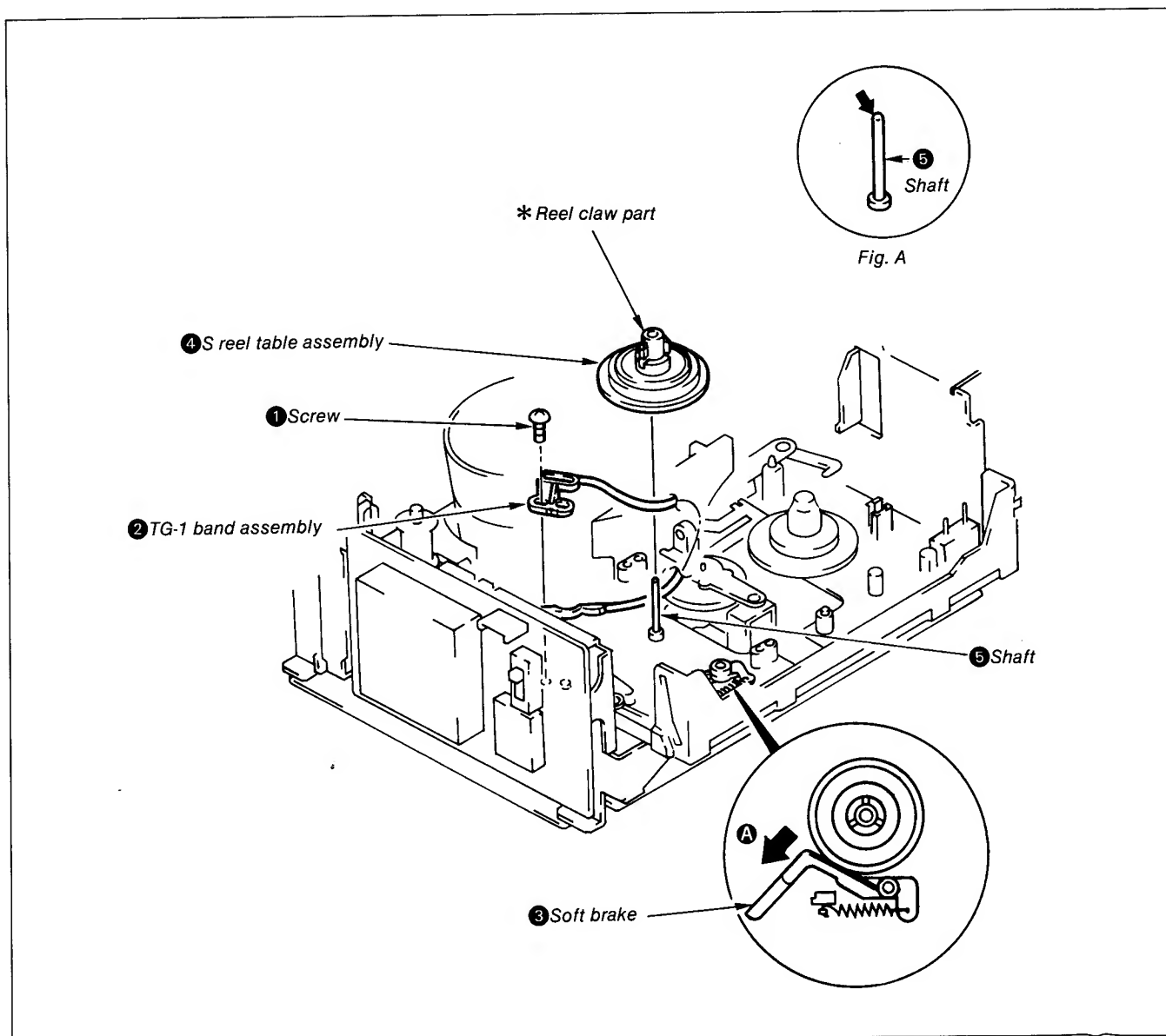


Fig. 8-14.

#### 8-3-4. T Reel Table Assembly (See Fig. 8-15)

##### 1. Removal

- 1) By referring to 8-1-1 and 8-1-2, remove the cassette arm assembly and LS cassette compartment assembly.
- 2) By referring to 8-3-1, remove reel lock lever assembly.
- 3) By referring to 8-3-2, remove pendulum stopper plate.
- 4) Remove T reel table assembly ①.

##### Note:

Perform removal of T reel table assembly ① by holding the reel claw section marked with \*.

##### 2. Installation

- 1) Apply over 1/3 drop and below 1/2 drop of oil to the arrow section of shaft ②, as in Fig. A.
- 2) Install T reel table assembly ① to shaft ②.
- 3) By referring to 8-3-2, install pendulum stopper plate.
- 4) By referring to 8-3-1, install reel lock lever assembly.
- 5) By referring to 8-1-1 and 8-1-2, install cassette arm assembly and LS cassette compartment assembly.

##### Note:

By referring to 8-3-26, perform check of reel table height.

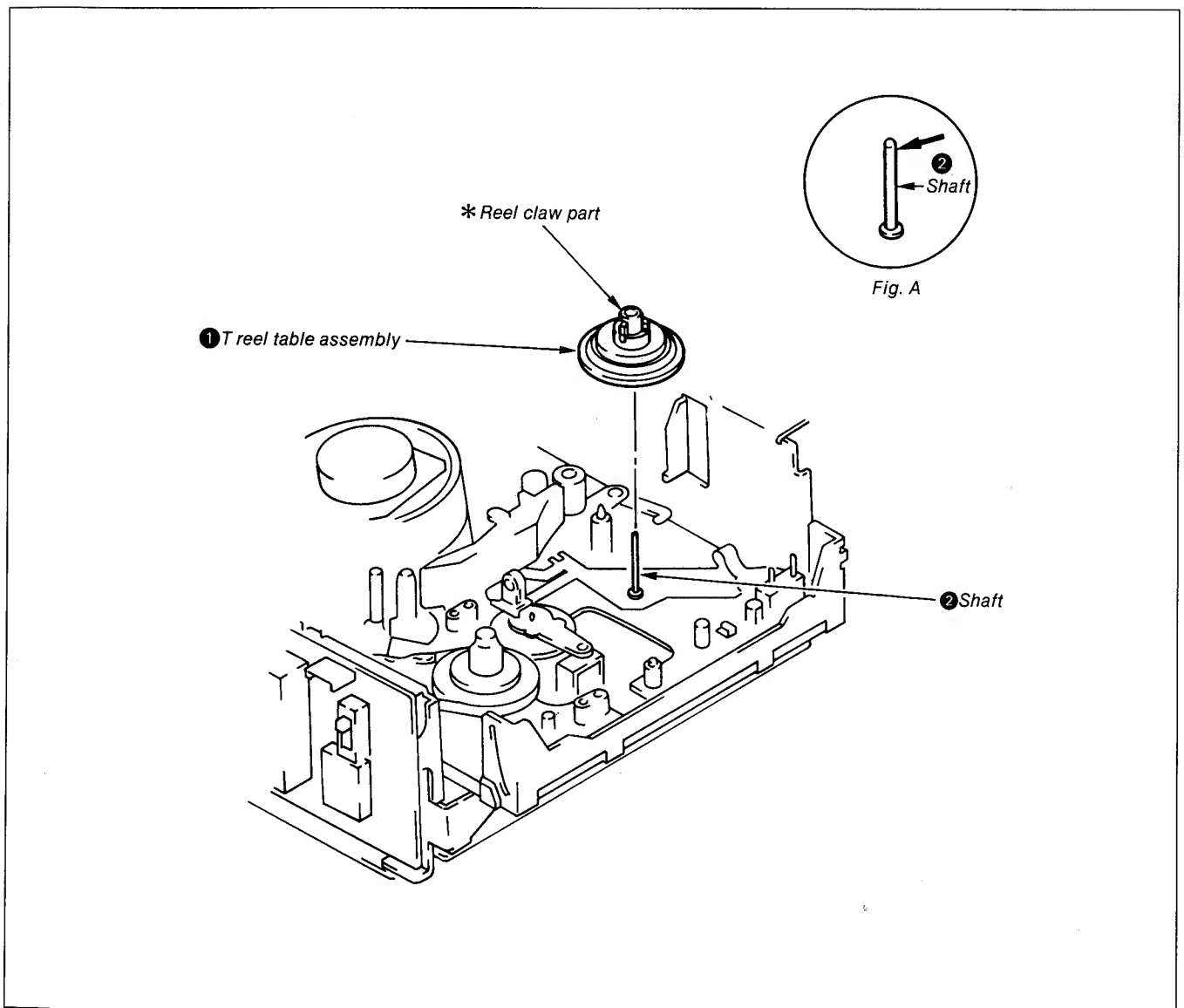


Fig. 8-15.

### 8-3-5. Pinch Arm B Assembly (See Fig. 8-16)

#### 1. Removal

- 1) By referring to 8-1-1 and 8-1-2, remove cassette arm assembly, and LS cassette compartment.
- 2) By referring to 8-3-1, remove reel lock lever assembly.
- 3) By referring to 8-3-2, remove pendulum stopper plate.
- 4) By referring to 8-3-4, remove T reel table assembly.
- 5) Remove tension coil spring ① from claw ②.
- 6) Remove stopper washer ③, and remove pinch arm B assembly ④.

#### 2. Installation

- 1) Apply molten grease to the arrow section of pinch arm B assembly ④, as shown in Fig. A.

- 2) Apply over 1/3 drop and below 1/2 drop of oil to the arrow section of shaft ⑤, as shown in Fig. B.
- 3) See to it that pinch arm B assembly ④ pin enters hole ⑥ and pinch arm A ⑦, and install to shaft ⑤.
- 4) Install stopper washer ③.
- 5) Hook the tension coil spring ① onto claw ②.
- 6) By referring to 8-3-4, install T reel table assembly.
- 7) By referring to 8-3-2, install pendulum stopper plate.
- 8) By referring to 8-3-1, install reel lock lever assembly.
- 9) By referring to 8-1-1 and 8-1-2, install cassette arm assembly and LS cassette compartment assembly.

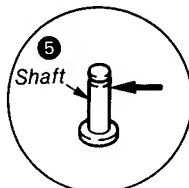


Fig. B

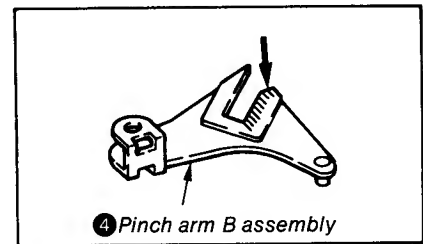


Fig. A

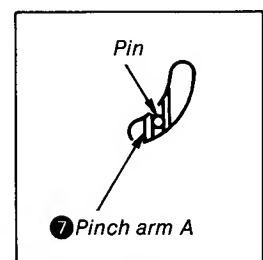
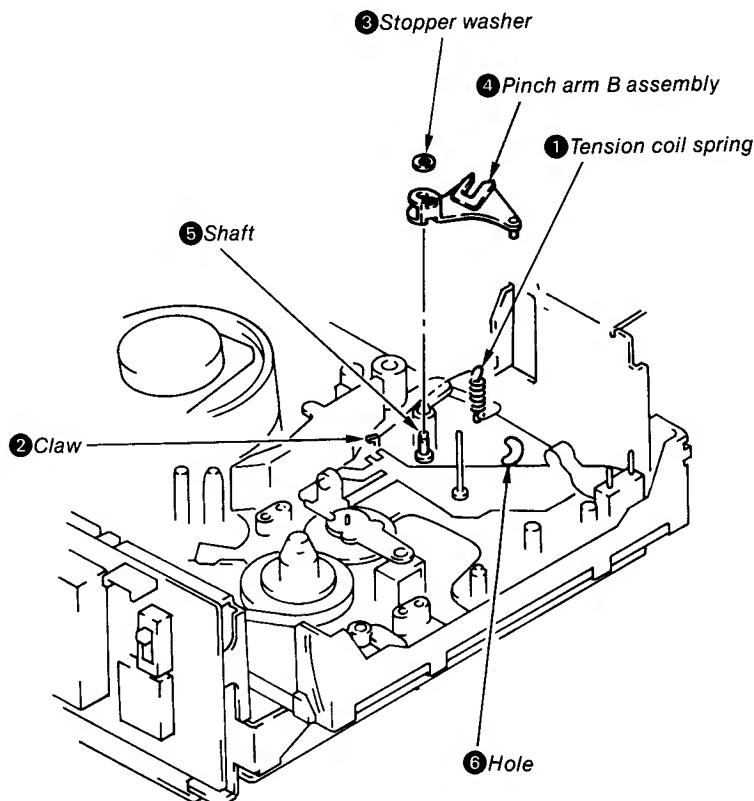


Fig. C

Fig. 8-16.

### 8-3-6. Pinch Arm C Assembly (See Fig. 8-17)

#### 1. Removal

- 1) By referring to 8-1-1 and 8-1-2, remove cassette arm assembly and LS cassette compartment assembly.
- 2) By referring to 8-3-1, remove reel lock lever assembly.
- 3) By referring to 8-3-2, remove pendulum stopper plate.
- 4) Remove tension coil lever ① from claw ②.
- 5) Remove stopper washer ③, and remove pinch arm C assembly ④ and pinch lever assembly ⑤.
- 6) Remove tension coil spring ⑥, and disassemble pinch arm C assembly ④ and pinch lever assembly ⑤.

#### Note:

Do not touch the roller section marked with \*.

#### 2. Installation

- 1) Apply over 1/3 drop and below 1/2 drop oil to the arrow section of shaft ⑦, as shown in Fig. A.
- 2) Install pinch lever assembly ⑤ to pin arm C assembly ④, and hook on tension coil spring ⑥.
- 3) Install pinch arm C assembly ④ and pin lever assembly ⑤ to shaft ⑦.
- 4) Install stopper washer ③.
- 5) Hook tension coil spring ① to claw ②.
- 6) By referring to 8-3-2, install pendulum stopper plate.
- 7) By referring to 8-3-1, install reel lock lever assembly.
- 8) By referring to 8-1-1 and 8-1-2, install cassette arm assembly and LS cassette compartment assembly.

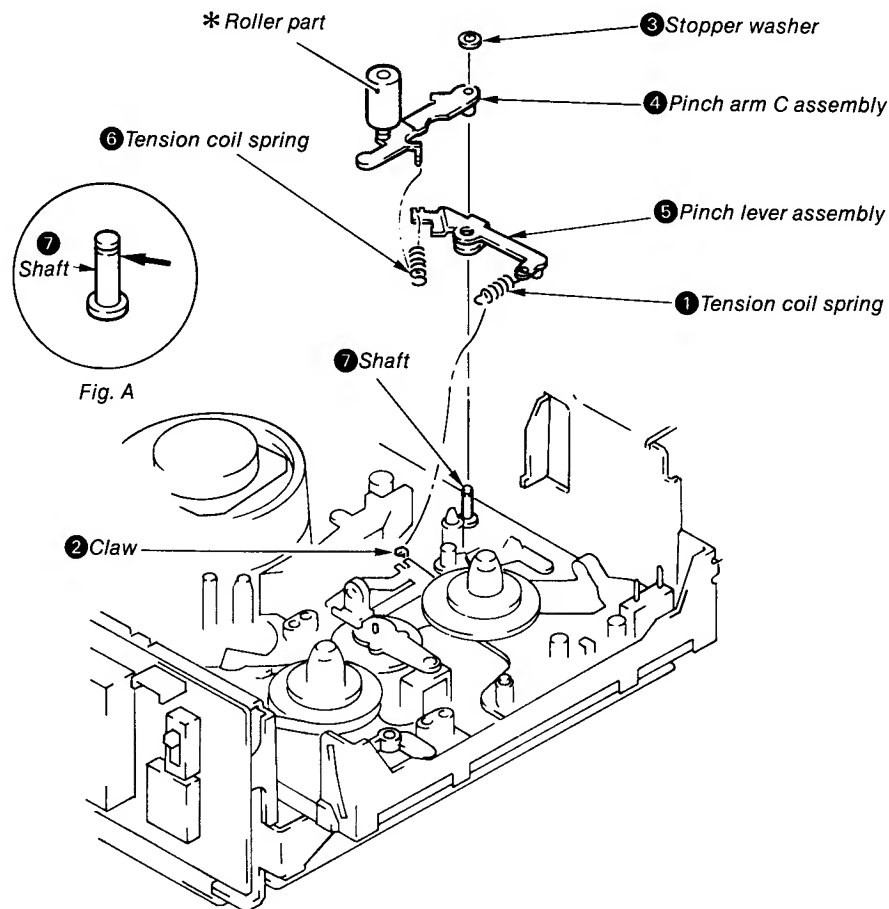


Fig. 8-17.

### 8-3-7. TG-1 Arm Assembly (See Fig. 8-18)

#### 1. Removal

- 1) By referring to 8-1-1 and 8-1-2, remove cassette arm assembly and LS cassette compartment assembly.
- 2) By referring to 8-3-1, remove reel lock lever assembly.
- 3) By referring to 8-3-2, remove pendulum stopper plate.
- 4) Remove stopper washer ①, and remove 1 screw ②.
- 5) Remove tension coil spring ③, and remove TG-1 arm assembly ④.

#### Note:

Do not touch the shoe section marked with \*, (see Fig. 8-19) and guide section marked with \*.

#### 2. Installation

- 1) Apply over 1/3 drop and below 1/2 drop of oil to the arrow section of shaft ⑤, as shown in Fig. A.
- 2) Install TG-1 arm assembly ④ to shaft ⑤.  
(Do not touch the guide section)

- 3) Wind the TG-1 band assembly ⑦ around the outer circumference of S reel table assembly ⑥, and install 1 screw ②.
- 4) Install stopper washer ①.
- 5) Hook tension coil spring ③ onto the position indicated in Fig. B.
- 6) By referring to 8-3-2, install pendulum stopper plate.
- 7) By referring to 8-3-1, install reel lock lever assembly.
- 8) By referring to 8-1-1 and 8-1-2, install cassette arm assembly and LS cassette compartment assembly.

#### Notes:

- 1) Be careful so as not to have any curving in the TG-1 band assembly ⑧.
- 2) By referring to 8-3-28, perform tension regulator position adjustment.
- 3) By referring to 8-3-29, perform FWD back tension adjustment.

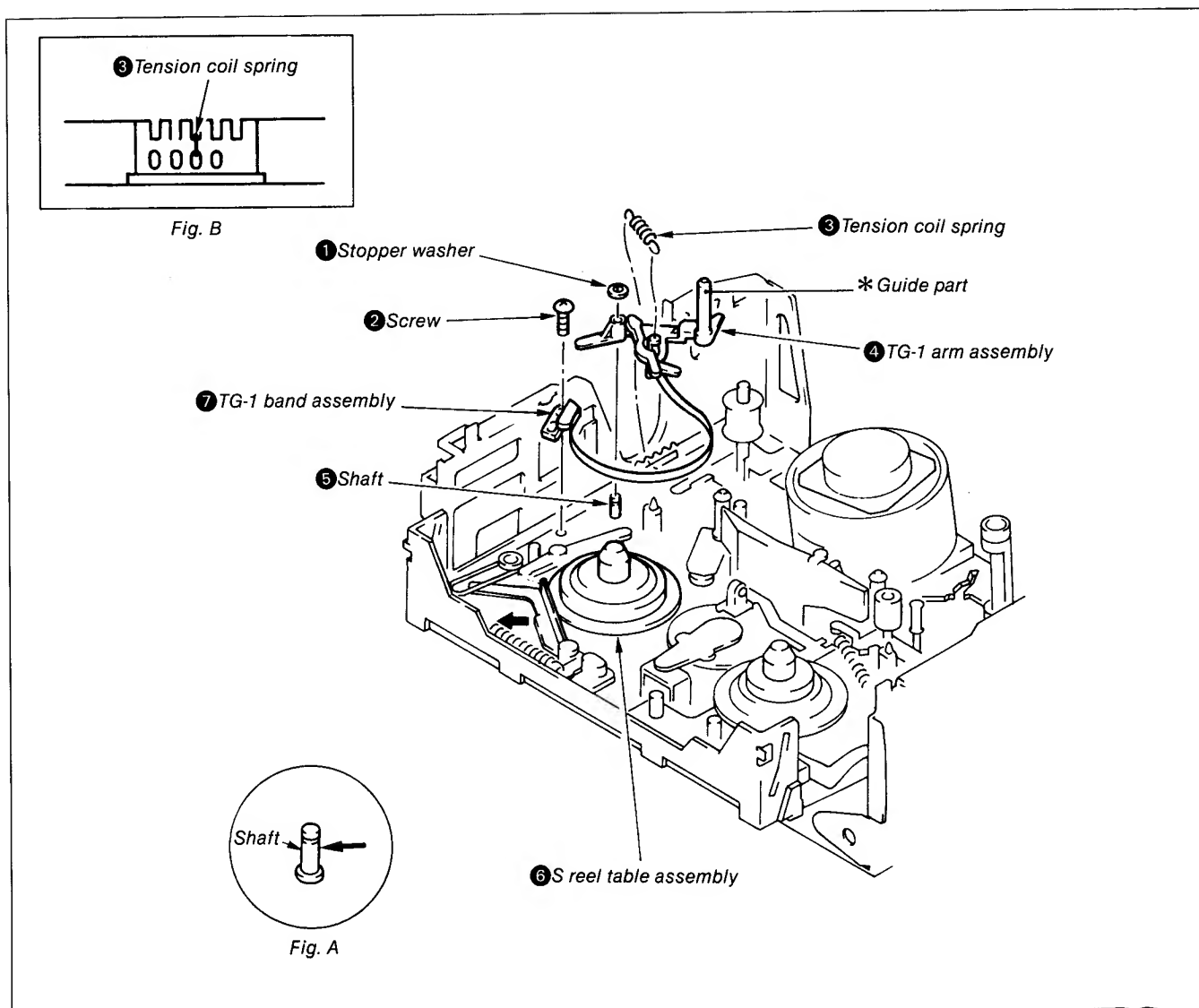


Fig. 8-18.

### 8-3-8. TG-1 Band Assembly (See Fig. 8-19)

#### 1. Removal

- 1) By referring to 8-3-7, remove TG-1 arm assembly.
- 2) Remove claw ② of TG-1 band assembly from slot of TG-1 arm assembly ③.

#### 2. Installation

- 1) Install claw ② of TG-1 band assembly ① into hole of TG-1 arm assembly ③.
- 2) Confirm that the TG-1 band assembly ① rotates smoothly centering around the hole of the TG-1 arm assembly ③.
- 3) By referring to 8-3-7, install TG-1 arm assembly.

#### Notes:

- 1) Be careful so as not to have any curving in the TG-1 band assembly ①.
- 2) Do not touch the shoe section marked with \* and guide section marked with \*.

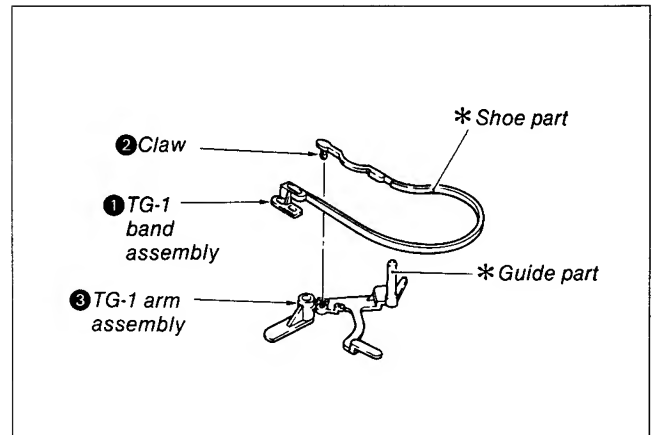


Fig. 8-19.

### 8-3-9. Soft Brake Assembly (See Fig. 8-20)

#### 1. Removal

- 1) By referring to 8-1-1 and 8-1-2, remove cassette arm assembly and LS cassette compartment assembly.
- 2) By referring to 8-3-1, remove reel lock lever assembly.
- 3) By referring to 8-3-2, remove pendulum stopper plate.
- 4) Remove tension coil spring ① from claw ②.
- 5) Remove soft brake assembly ③. (See Fig. 8-20)

#### 2. Installation

- 1) Install soft brake assembly. At this time place the A section under the LS plate spring ④.
- 2) Hook tension coil spring ① onto claw ②.
- 3) By referring to 8-3-2, install reel lock lever assembly.
- 4) By referring to 8-3-1, install reel lock lever.
- 5) By referring to 8-1-1 and 8-1-2, install cassette arm assembly and LS cassette compartment assembly.

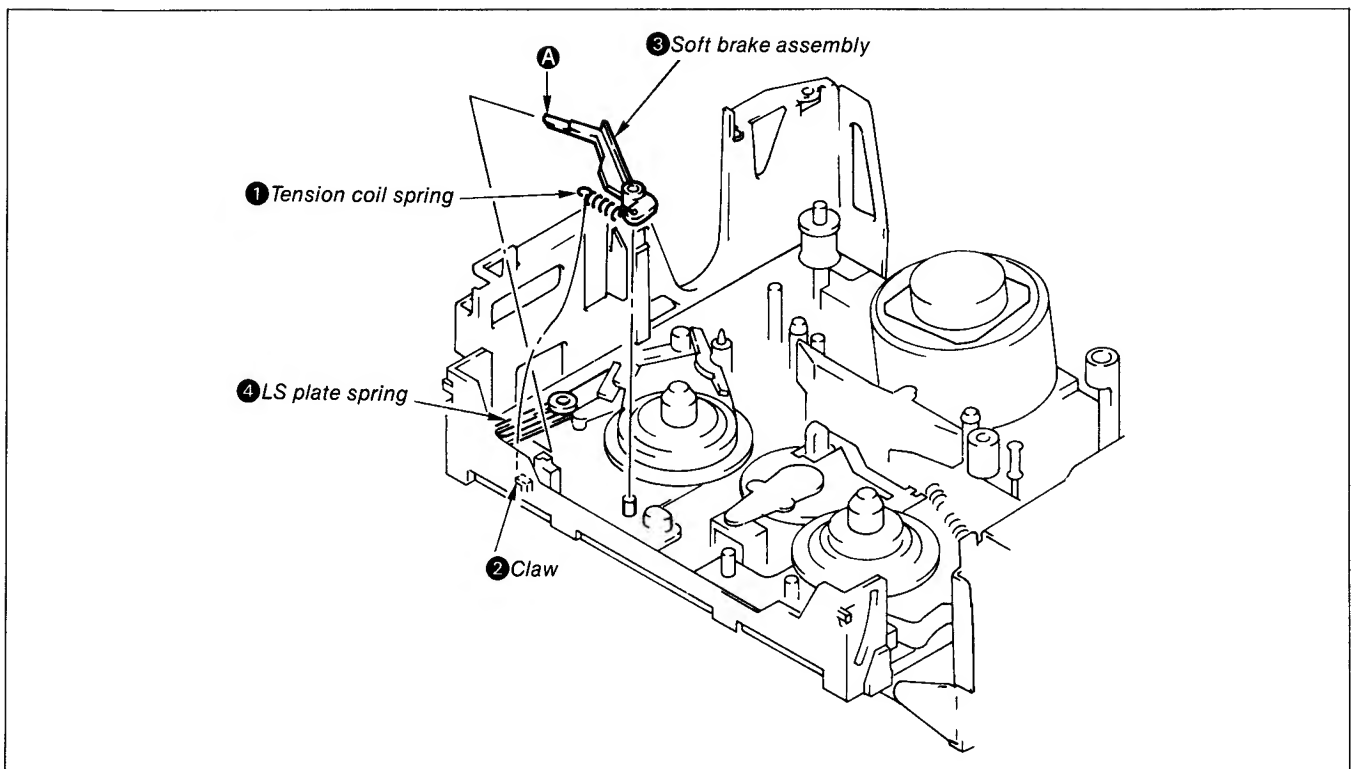


Fig. 8-20.



### 8-3-10. LS Chassis Assembly (See Fig. 8-21)

#### 1. Removal

- 1) By referring to 8-1-1 and 8-1-2, remove cassette arm assembly and LS cassette compartment assembly.
- 2) Set to **GUIDE LOAD after BLANK**.
- 3) Remove stopper washer ①.
- 4) Remove three each of screws ② and LS guides ③.
- 5) Remove LS chassis assembly ④ in the direction of arrow A.
- 6) Remove 7 sections of the soldered sections ⑥ of FP-53 flexible board ⑤ with a soldering iron, as shown in Fig. A. and remove FP-53 flexible board ⑤ which is stuck to the mechanical chassis.

#### 2. Installation

- 1) Peel off tape attached to the rear of FP-53 flexible board ⑤, and stick on by matching the shaft of the mechanical chassis with the pattern.
- 2) Solder the sections of the FP-53 flexible board ⑤, as shown in Fig. B.
- 3) Apply molten grease to the arrow section of LS chassis assembly ④, as shown in Fig. C.
- 4) Move reel lock lever assembly ⑥ in the direction of arrow E, and install by matching the four positions of the attachment holes of LS chassis assembly ④ with the shaft of the mechanical chassis.

- 5) Engage two positions of claw ⑦ to drum base.
- 6) Move TG-7 arm assembly ⑧ in the direction of arrow F, (gently with tweezers, etc.), and insert into the hole of the mechanical chassis.
- 7) Insert pin ⑩ of LS gear assembly to slot ⑨ of LS cam plate, as shown in Fig. D.
- 8) Insert TS arm ⑪ into U groove of pinch arm A ⑫.
- 9) Confirm that the reel lock lever assembly ⑥ is not run onto the reel lock lever B ⑬.
- 10) Confirm that the TG1 release arm ⑭ is not run onto the M slider ⑮.
- 11) Confirm that the pin of pendulum gear arm assembly ⑯ is peeping out of the hole of the pendulum stopper plate ⑰.

#### Note:

Confirm tht mechanical chassis assembly parts have been properly assembled.

- 12) Confirm that it is completely installed, and install three each of LS guides ③ and screws ② respectively.
- 13) Install stopper washer ①.
- 14) Use mode selector and confirm that loading and threading are being performed smoothly.
- 15) By referring to 8-1-1 and 8-1-2, install cassette arm assembly and LS cassette compartment assembly.

#### Note:

Perform the soldering rapidly.

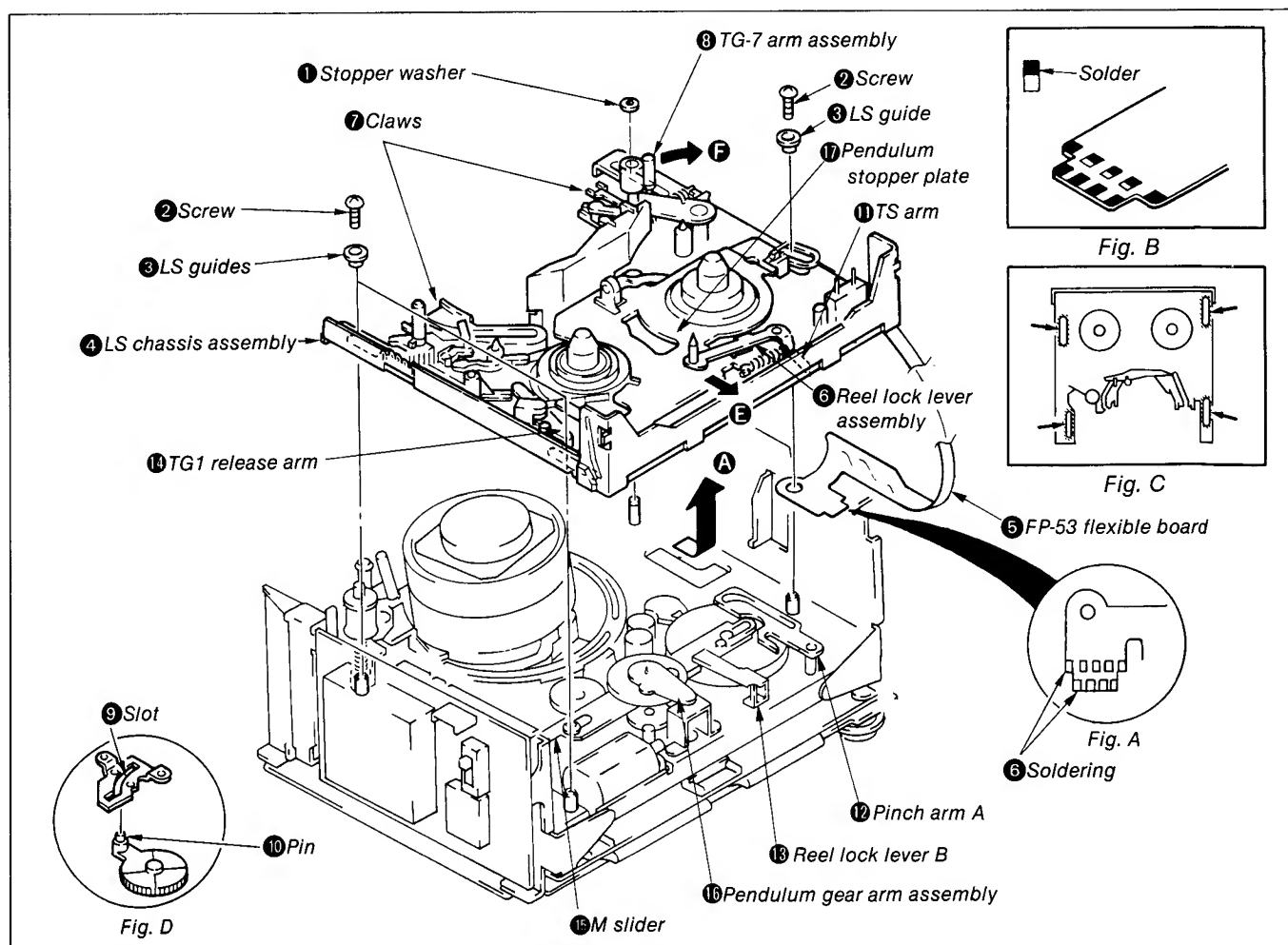


Fig. 8-21.

### 8-3-11. TG-7 Arm Assembly (See Fig. 8-22)

#### 1. Removal

- 1) By referring to 8-1-1 and 8-1-2, remove cassette arm assembly and LS cassette compartment assembly.
- 2) By referring to 8-3-10, remove LS chassis assembly.
- 3) Turn over LS chassis assembly.
- 4) Remove stopper washer ② (t = 0.3mm).
- 5) Remove TG-7 spring ② from claw ③, and remove TG-7 arm assembly ④.

#### Note:

- 1) As the FP-53 flexible board \* is connected to the mechanical chassis, caution should be taken that it is not broken off.
- 2) Be careful not to deform the TG-7 arm.

#### 2. Installation

- 1) Apply over 1/3 drop and below 1/2 drop of oil to the arrow section of shaft, as shown in Fig. A.
- 2) Install TG-7 arm assembly ④ by way of TG-7 spring ②.
- 3) Hook TG-7 spring ② onto claw ③.
- 4) Install stopper washer ①.
- 5) By referring to 8-3-10, install LS chassis assembly.
- 6) By referring to 8-1-1 and 8-1-2, install cassette arm assembly and LS cassette compartment assembly.
- 7) Perform presetting of guide block height (Refer 8-4 TAPE PATH ADJUSTMENT).

#### Note:

Confirm that stopper washers ① is completely inserted into the notch of the shaft.

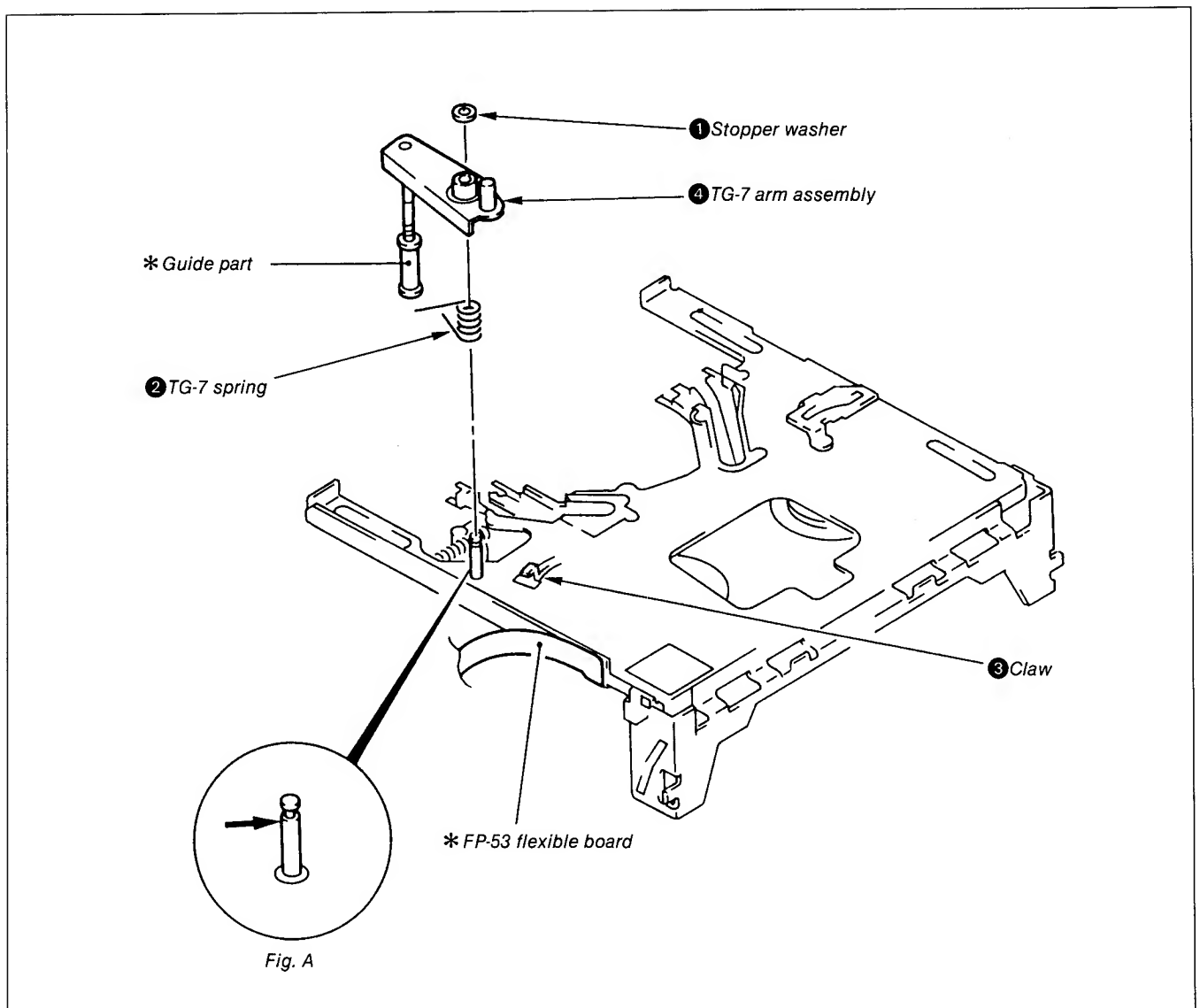


Fig. 8-22.

### 8-3-12. Pinch Arm A Assembly (See Fig. 8-23)

#### 1. Removal

- 1) By referring to 8-1-1 and 8-1-2, remove cassette arm assembly and LS cassette compartment assembly.
- 2) By referring to 8-3-10, remove LS chassis assembly.
- 3) Remove stopper washer ①.
- 4) Remove pinch arm A assembly ②.

#### 2. Installation

- 1) Apply over 1/3 drop and below 1/2 drop of oil to arrow section of shaft, as shown in Fig. A.

- 2) Apply molten grease to arrow section of pinch arm A assembly ②, as shown in Fig. B.
- 3) Insert pin of pinch arm A assembly ② into outer notch of cam assembly ③, and install to shaft.
- 4) Install stopper washer ①.
- 5) By referring to 8-3-10, install LS chassis assembly.
- 6) By referring to 8-1-1 and 8-1-2, install cassette arm assembly and LS cassette compartment assembly.

#### Note:

Confirm that stopper washer ① is completely inserted into shaft.

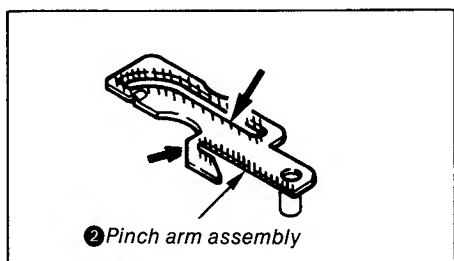


Fig. B

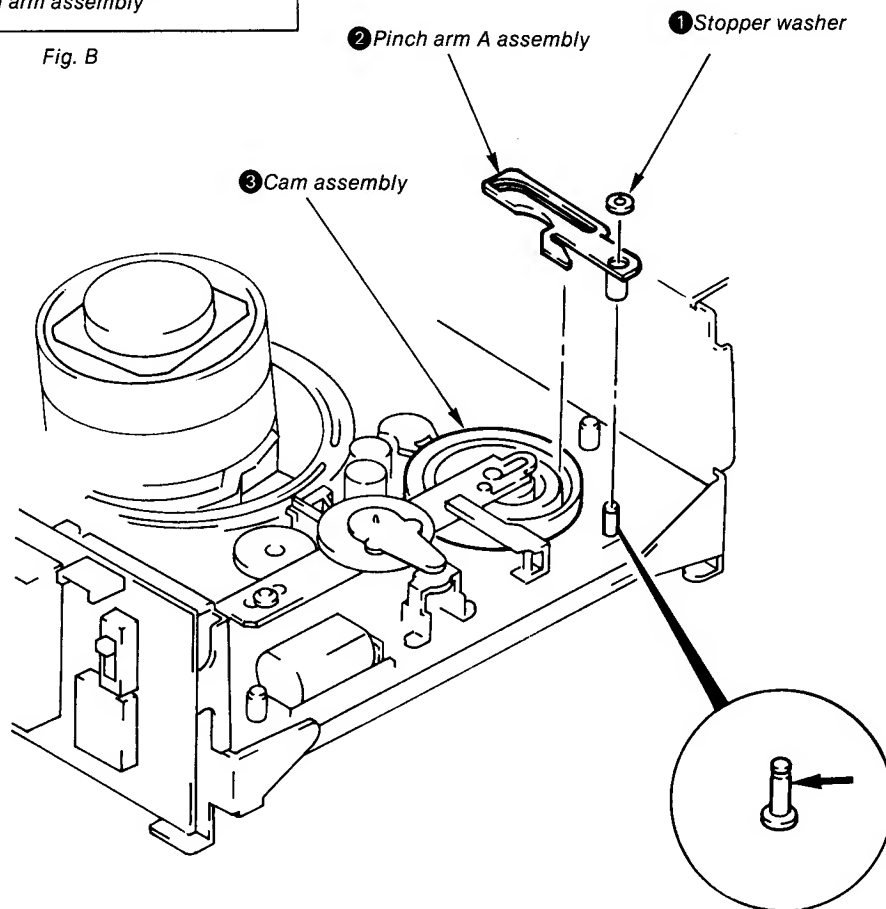


Fig. A

Fig. 8-23.

### 8-3-13. M Slider Assembly (See Fig. 8-24)

#### 1. Removal

- 1) By referring to 8-1-1 and 8-1-2, remove the cassette arm assembly and LS cassette assembly.
- 2) By referring to 8-3-10, remove the LS chassis.
- 3) Remove pendulum gear arm.
- 4) Remove E ring ② and remove reel lock lever B ③.
- 5) Remove stopper washer ④.
- 6) Remove stopper washer ⑤ and M slider assembly ⑥.

#### 2. Installation

- 1) Apply molten grease to the arrow marked point of M slider assembly ⑥, as shown in Fig. A.
- 2) Insert pin of the M slider assembly ⑥ into the inner notch of cam assembly ⑦ and install.

- 3) Remove stopper washer ⑤ and stopper washer ④.
- 4) Apply molten grease to the arrow marked point of reel lock lever B ③, as shown in Fig. B.
- 5) Apply over 1/3 drop and below 1/2 drop of oil to the arrow marked point on the shaft, as shown in Fig. C and E.
- 6) Install reel lock lever so as to be inserted in between the bent-up part and pin, as shown in Fig. D.
- 7) Install E ring ②.
- 8) Apply over 1/3 drop and below 1/2 drop of oil to the shaft of relay base assembly ⑧.
- 9) Install pendulum gear arm ①.
- 10) By referring to 8-3-10, install LS chassis assembly.
- 11) By referring to 8-1-1 and 8-1-2, install cassette arm assembly and LS cassette compartment assembly.

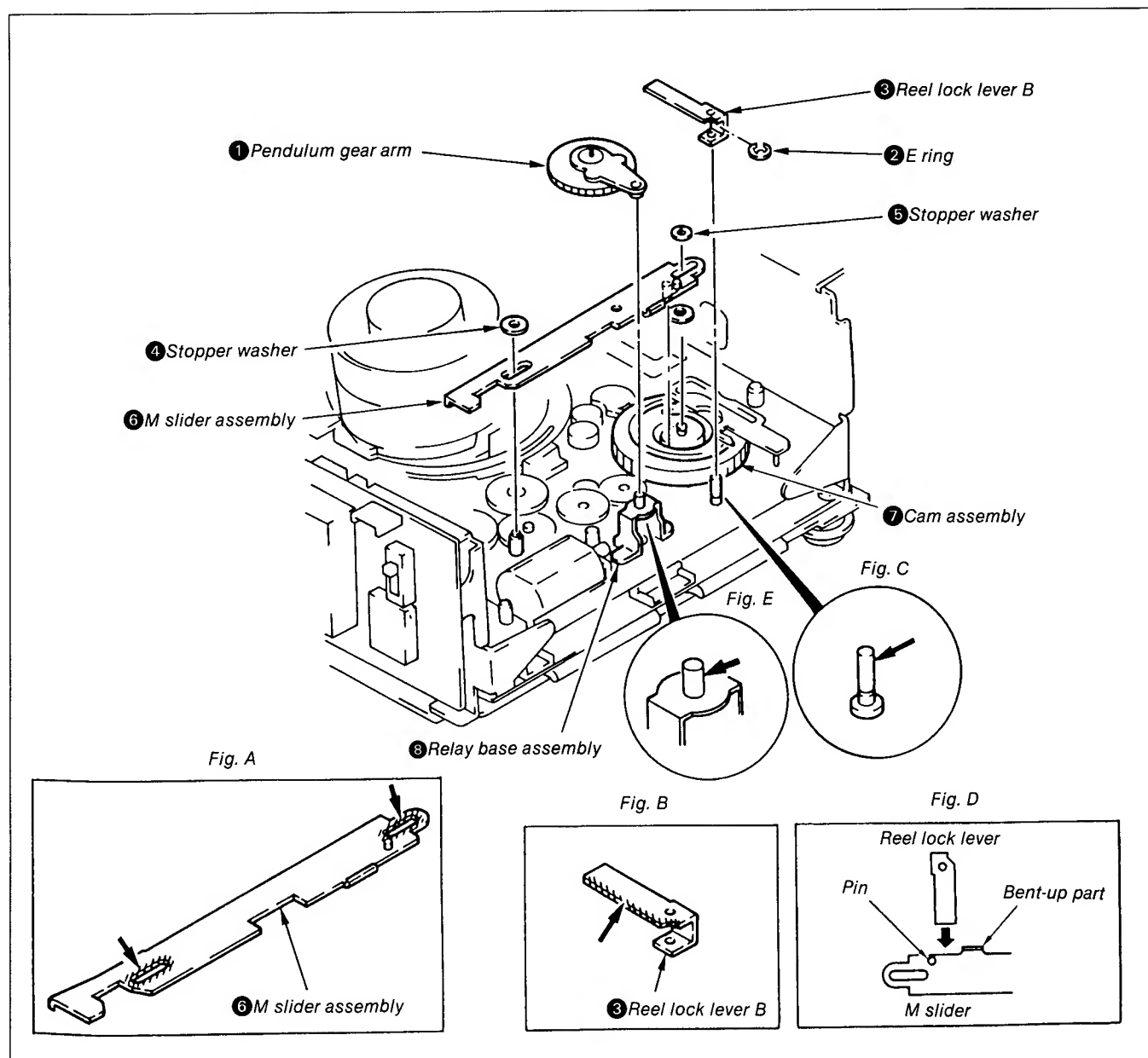


Fig. 8-24.

### 8-3-14. TG-4 Base Assembly and TG-5 Base Assembly

#### 1. Removal

- 1) By referring to 8-1-1 and 8-1-2, remove cassette arm assembly and LS cassette compartment assembly.
- 2) By referring to 8-3-10, remove LS chassis assembly.
- 3) Set into **[GUIDE LOAD]** mode and remove TG-4 base assembly ① and TG-5 base assembly ② from the groove of the drum base.
- 4) Remove the TG-4 base assembly from the notch ③ by turning around section the upper of pin ⑤ in the direction of arrow A by centering pin ④ of the TG-4 base assembly ①. (See Fig. 8-25.)
- 5) Remove pin ⑤ from the hole of notch ③.
- 6) Remove TG-5 base assembly ② from notch ⑦ by moving it in the direction of arrow A (See Fig. 8-26)
- 7) Remove TG-5 base assembly ② from pin ⑥. (See Fig. 8-27)

#### Note:

Be sure not to contact with the guide section marked with \*.

#### 2. Installation

- 1) Insert pin ⑥ into the hole of TG-5 base assembly ②.
- 2) Insert TG-5 base assembly ② beneath notch ⑦ by moving it in the direction of arrow B.
- 3) Insert pin ⑤ of TG-5 base assembly ② into the hole of notch ③.
- 4) Set pin ④ of TG-4 base assembly ① into notch ③ by turning it in the direction of arrow B.
- 5) Confirm that the TG-4 base assembly ① and TG-5 base assembly ② have been installed in the states as shown in Fig. A and B respectively.
- 6) Set TG-4 base assembly ① and TG-5 base assembly ② into the groove of the drum base while slowly turning **[BLANK after GUIDE LOAD]** mode. If the position are not matched, the assembly is caught by the entrance of the groove and, accordingly, it may be unable to move. Therefore, be sure to set it into the groove while matching the positions very carefully.
- 7) By referring to 8-3-10, install LS chassis assembly.
- 8) By referring to 8-1-1 and 8-1-2, install cassette arm assembly and LS cassette compartment assembly.

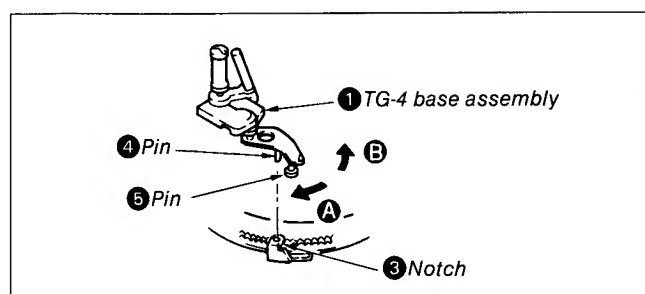


Fig. 8-25.

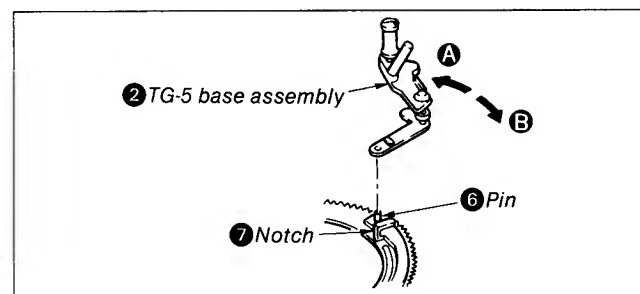


Fig. 8-26.

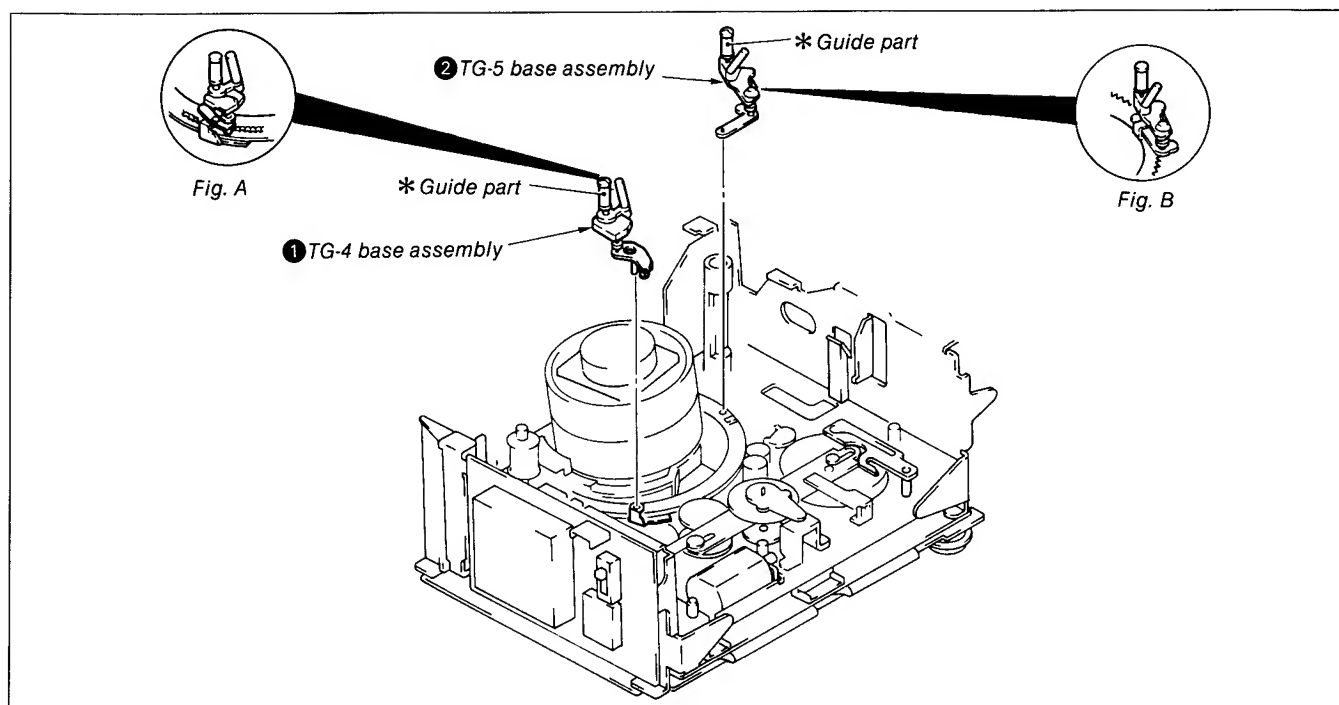


Fig. 8-27.

### 8-3-15. Loading Slider T Assembly (See Fig. 8-28)

#### 1. Removal

- 1) By referring to 8-1-1 and 8-1-2, remove cassette arm assembly and LS cassette compartment assembly.
- 2) By referring to 8-3-10, remove LS chassis assembly.
- 3) By referring to 8-3-14, remove TG-4 base assembly and TG-5 base assembly.
- 4) By referring to 8-3-24, remove drum unit.
- 5) Remove screw ①, and remove plate spring T ② and T slider stopper ③.
- 6) Remove screw ④ and remove slider supporter ⑤.
- 7) Remove two lock washers ⑥ and remove loading slider T assembly ⑦.

#### 2. Installation

- 1) Apply molten grease to the arrow marked point of plate spring T ②, as shown in Fig. A.
- 2) Apply molten grease to the arrow marked point of loading slider T assembly ⑦, as shown in Fig. B.

- 3) Install loading slider T assembly ⑦ by matching hole ⑧ of the loading slider T assembly to hole ⑨ of the loading slider S assembly.
- 4) Install two locking washers ⑥.
- 5) Install slider supporter ⑤ with screw ④.
- 6) Install T slider stopper ③ and plate spring ② with screw ①.
- 7) By referring to 8-3-24, install drum unit.
- 8) By referring to 8-3-14, install TG-4 base assembly and TG-5 base assembly.
- 9) By referring to 8-3-10, install LS chassis assembly.
- 10) By referring to 8-1-1 and 8-1-2, install cassette arm assembly and LS cassette compartment assembly.

#### Notes:

- 1) Be sure to confirm that lock washer ② has been engaged completely into the groove of the shaft.
- 2) By referring to 8-3-17, perform phase adjustment after loading slider T assembly ⑦ is installed.

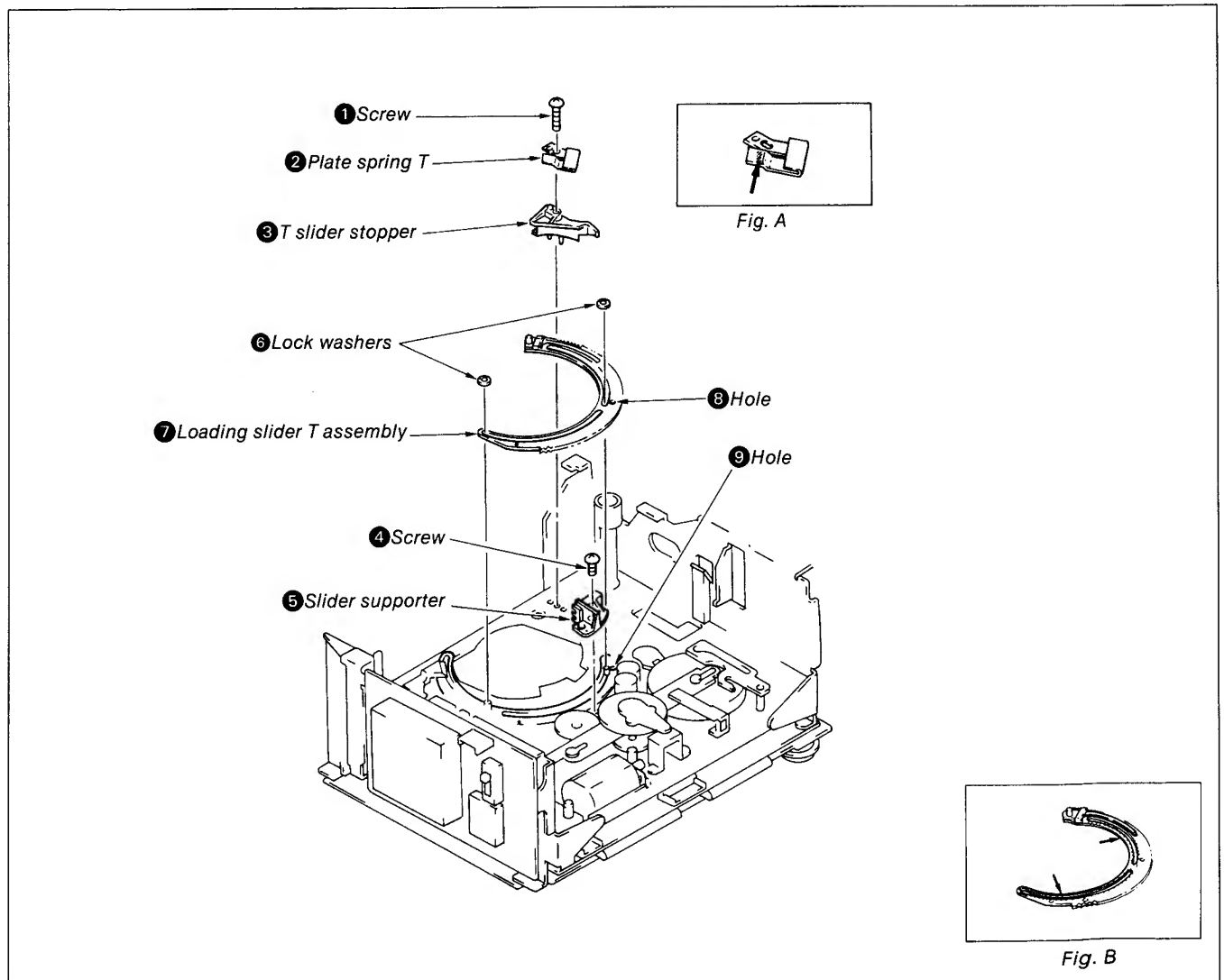


Fig. 8-28.



### 8-3-16. Loading Slider S Assembly (See Fig. 8-29)

#### 1. Removal

- 1) By referring to 8-1-1 and 8-1-2, remove cassette arm assembly and LS cassette compartment assembly.
- 2) By referring to 8-3-10, remove LS chassis assembly.
- 3) By referring to 8-3-14, remove TG-4 base assembly and TG-5 base assembly.
- 4) By referring to 8-3-24, remove drum unit.
- 5) By referring to 8-3-15, remove loading slider T assembly.
- 6) Remove screw ① and remove S slider stopper ②.
- 7) Remove two guide rollers ③ and remove loading slider S assembly ④.

#### 2. Installation

- 1) Apply a little molten grease to the arrow marked two point of shaft ⑤, as shown in Fig. A.
- 2) Apply molten grease to the arrow marked point of loading slider S assembly ④, as shown in Fig. B.

- 3) Install loading slider S assembly ④ by matching hole ⑥ of loading slider S assembly to hole ⑦ of the mechanical chassis.
- 4) Install two guide rollers ③.
- 5) Install S slider stopper ② with screw ①.
- 6) By referring to 8-3-15, install loading slider T assembly.
- 7) By referring to 8-3-24, install drum unit.
- 8) By referring to 8-3-14, install TG-4 base assembly and TG-5 base assembly.
- 9) By referring to 8-3-10, install cassette arm assembly and LS cassette compartment assembly.
- 10) By referring to 8-1-1 and 8-1-2, install cassette arm assembly and LS cassette compartment assembly.

#### Note:

By referring to 8-3-17, perform phase adjustment after loading slider T assembly has been installed.

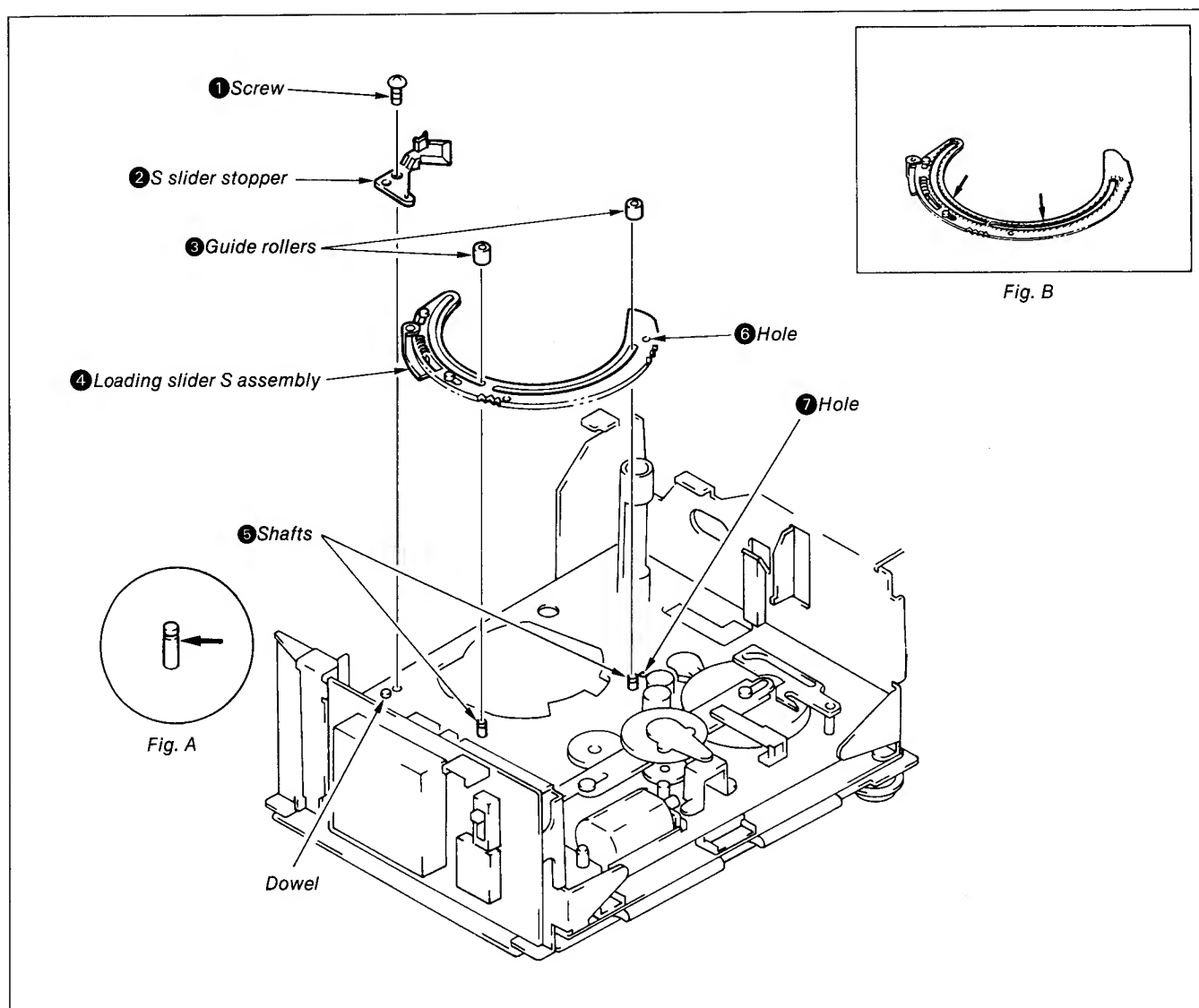


Fig. 8-29.

### 8-3-17. Phase Adjustment (See Fig. 8-30)

#### 1. Removal

- 1) By referring to 8-1-1 and 8-1-2, remove cassette arm assembly and LS cassette compartment assembly.
- 2) By referring to 8-3-10, remove LS chassis.
- 3) By referring to 8-3-14, remove TG-4 base assembly and TG-5 base assembly.
- 4) By referring to 8-3-24, remove drum unit. (See Fig. 8-30)
- 5) Remove the stopper washer ⑩ and then remove the loading gear S ⑥.
- 6) Remove the stopper washer ⑧ and the LS gear A ⑦.

#### 2. Adjustment

- 1) Confirm that it has been turned into BLANK after GUIDE LOAD mode.
- 2) Adjust the positions of the respective holes of loading slider T assembly ②, loading slider S assembly ③, and the mechanical chassis, and then insert a rods ① of approximately 1mm in diameter into the holes.
- 3) Adjust the position of the hole of LS gear C assembly and the position of the hole of the mechanical chassis, and insert rods ① of approximately 1mm in diameter into the holes.

- 4) Adjust by turning loading gear M ⑤ so that the notch portion on it comes to the loading gear S ⑥ side, as shown in Fig. A.
- 5) As shown in Fig. B, align the hole of the loading slider T assembly ② with that of the LS gear A ⑦, and mount the LS gear A ⑦.
- 6) Install stopper washer ⑧.
- 7) Remount the loading gear S ⑥, and then install, the stopper washer ⑩.

#### Note:

Be sure to confirm that stopper washer ⑧ and ⑩ are set completely in the groove of the shaft.

#### 3. Installation

- 1) Similarly to Fig. C, apply grease (one drop equivalent to a grain of rice) to the five positions on the internal grove of the cam assembly ⑨.
- 2) By referring to 8-3-25, install drum unit.
- 3) By referring to 8-3-14, install TG-4 base assembly and TG-5 base assembly.
- 4) By referring to 8-3-10, install LS chassis assembly.
- 5) By referring to 8-1-1 and 8-1-2, install cassette arm assembly and LS cassette assembly.

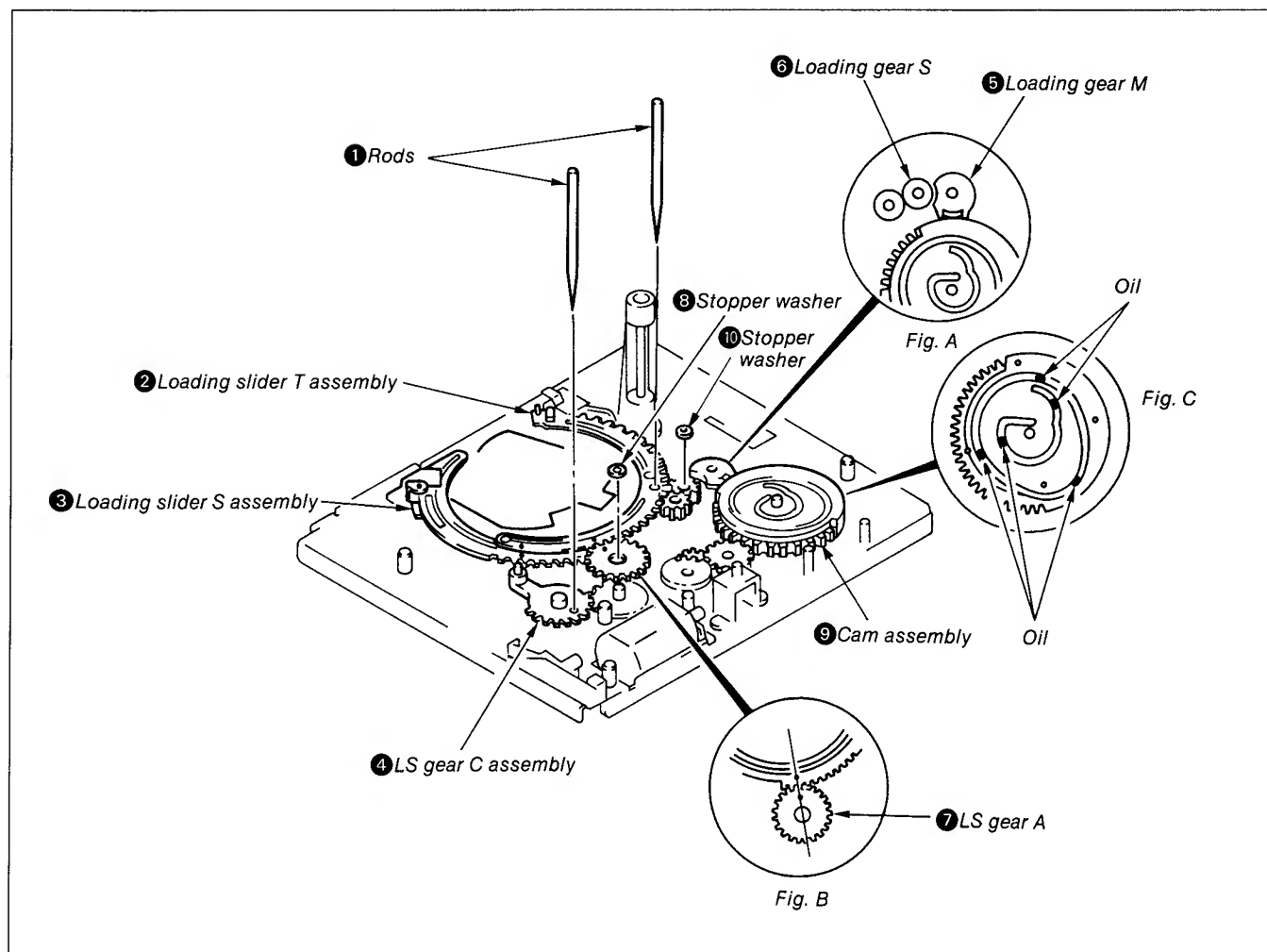


Fig. 8-30.

### 8-3-18. Gear Train Operation Check (See Fig. 8-31)

#### 1. Removal

- 1) By referring to 8-1-1 and 8-1-2, remove cassette arm assembly and LS cassette compartment assembly.
- 2) By referring to 8-3-10, remove LS chassis assembly.
- 3) By referring to 8-3-14, remove TG-4 base assembly and TG-5 base assembly.
- 4) By referring to 8-3-24, remove drum unit.
- 5) By referring to 8-3-21, remove LM motor assembly.

#### 2. Checking

- 1) Insert a point of tweezers into the hole of the cam assembly ❶.
- 2) Rotate the cam assembly ❶ once around in the direction of arrow A, and then once around in the direction of arrow B. Repeat the above three times.

- 3) At this point, confirm that the individual gears and sliders shown in Fig. are being operated smoothly, and there are no abnormal loading.

#### Note:

When making cam assembly ❶ to rotate with the point of tweezers, exercise cautions so as not to cause flaw to the mechanical chassis.

#### 3. Installation

- 1) By referring to 8-3-21, install LM motor assembly.
- 2) By referring to 8-3-24, install drum unit.
- 3) By referring to 8-3-14, install TG-4 base assembly and TG-5 base assembly.
- 4) By referring to 8-3-10, install LS chassis assembly.
- 5) By referring to 8-1-1 and 8-1-2, install cassette arm assembly and LS cassette compartment assembly.

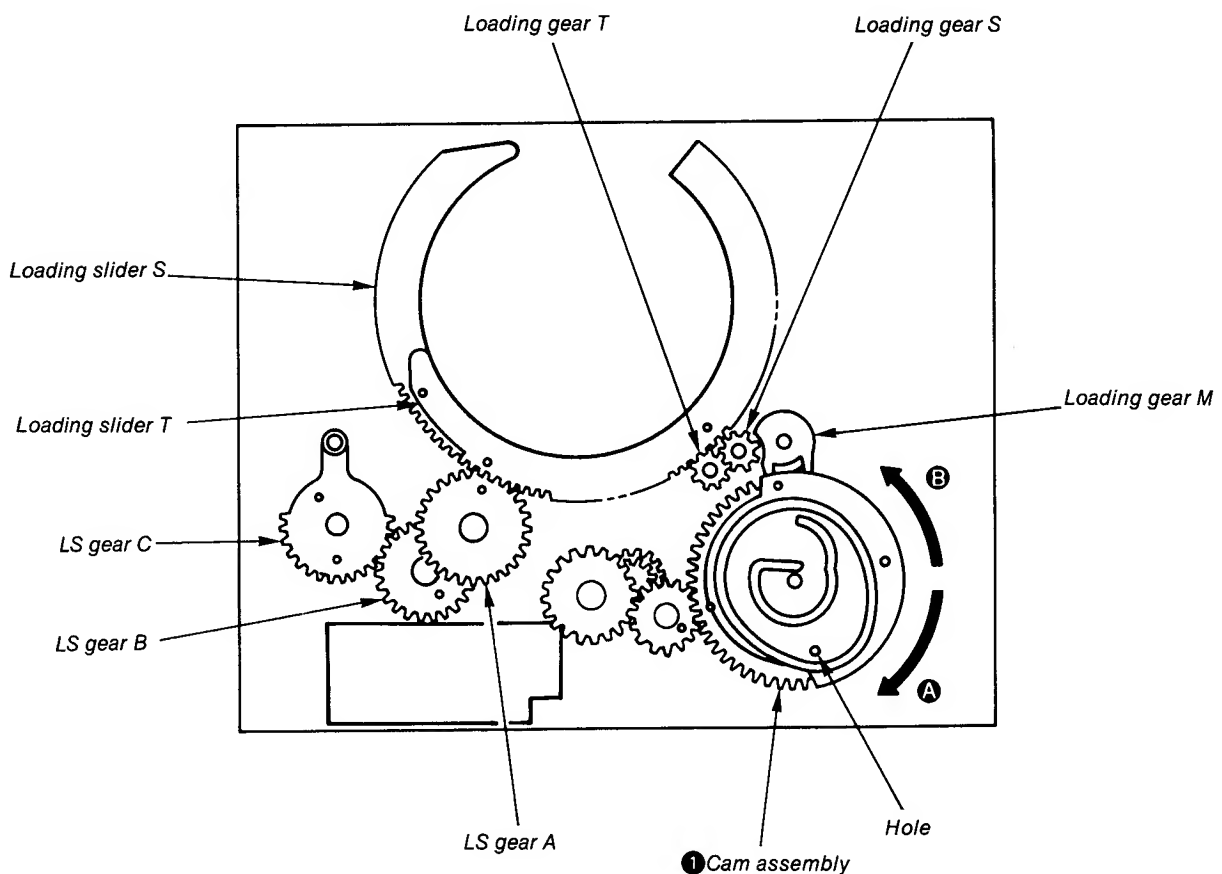


Fig. 8-31.

### 8-3-19. FP-53 Flexible Board (See Fig. 8-32)

#### 1. Removal

- 1) By referring to 8-1-1 and 8-1-2, remove cassette arm assembly and LS cassette compartment assembly.
- 2) By referring to 8-3-10, remove LS chassis assembly.
- 3) By referring to 8-3-4, remove T reel table assembly.
- 4) By referring to 8-3-3, install S reel assembly.
- 5) Remove two claws **1** and lift the push switch. Then, peel off the flexible board **2** stuck to the LS chassis.

#### Note:

When peeling off FP-53 flexible board **2**, care must be taken so as not to tear it.

#### 2. Installation

- 1) Clean the joint section of the LS chassis assembly and the FP-53 flexible board **2** with a cleaning liquid.
- 2) Peel off the sheet covering of the adhesion tape on the rear side of a new FP-53 flexible board **2** and match the shaft hole to shaft **3** of the LS chassis and claw, and thus the tape is adhered.
- 3) Adjust dowel **5** (two positions) and install it with claws **1**, and match hole of FP-53 flexible board **2** to dowel **6**.
- 4) By referring to 8-2-3,
- 5) By referring to 8-3-4, install T reel table assembly.
- 6) By referring to 8-3-10, install LS chassis assembly.
- 7) By referring to 8-1-1 and 8-1-2, install cassette arm assembly and LS cassette compartment assembly.

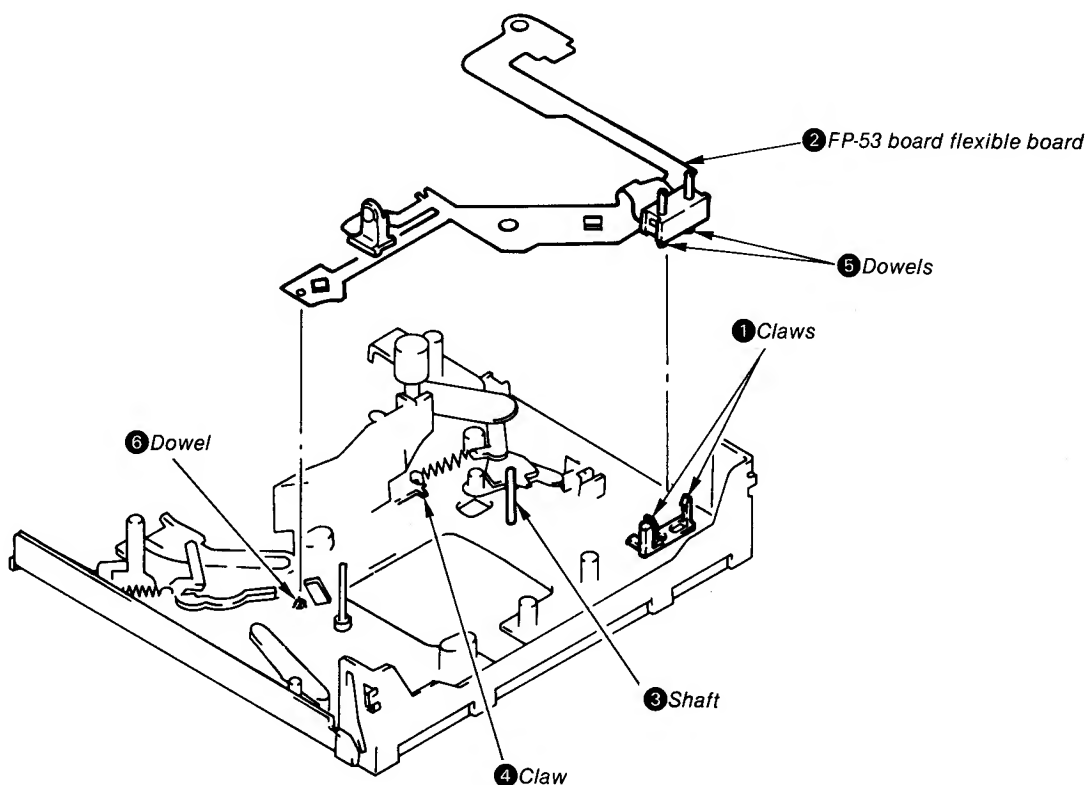


Fig. 8-32.

### 8-3-20. Cassette Compartment Lock Assembly (See Fig. 8-33)

#### 1. Removal

- 1) By referring to 8-1-1 and 8-1-2, remove cassette arm assembly and LS cassette compartment assembly.
- 2) By referring to 8-3-10, remove LS chassis assembly.
- 3) Remove screw ① and screw ②, and remove cassette compartment lock assembly ③.
- 4) Remove screw ④ and remove CCD switch ⑤.

#### 2. Installation

- 1) Install CCD switch ⑤ with screw ④.
- 2) Match cassette compartment lock assembly ③ to dowel ⑥, and install.

- 3) Install screw ② loosely and then tighten screw ① and screw ② successively in this order.
- 4) By referring to 8-3-10, install LS chassis assembly.
- 5) By referring to 8-1-1 and 8-1-2, install cassette arm assembly and LS cassette compartment assembly.

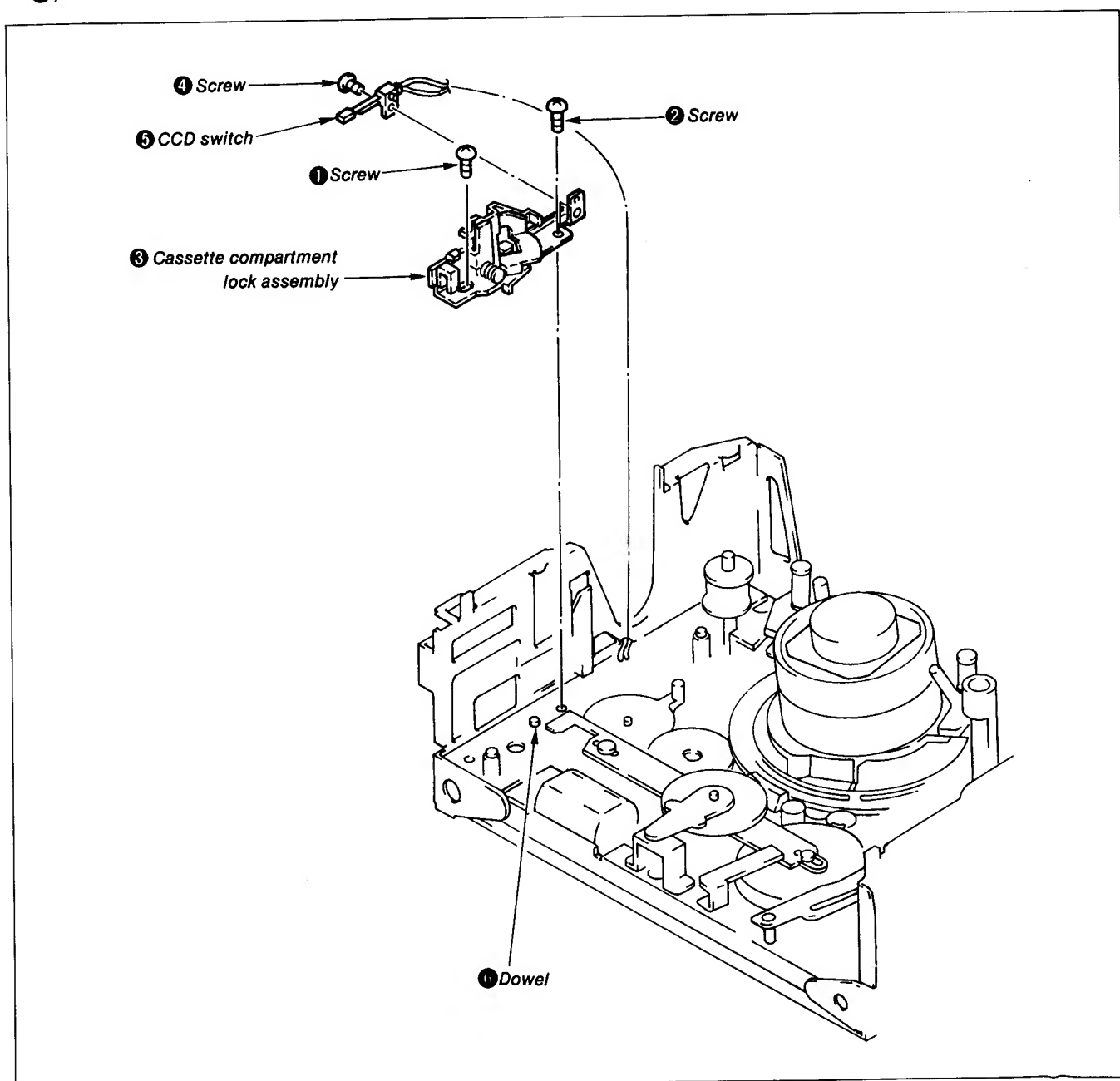


Fig. 8-33.

### 8-3-21. LM Motor Assembly (See Fig. 8-34)

#### 1. Removal

- 1) By referring, Section 2 DISASSEMBLY, 2-6 Opening the SS-70 board.
- 2) Remove screws ①, ② and ③, and remove the LM motor assembly ④ in the direction of arrow A.
- 3) Remove two screws ⑤ and disassemble motor holder assembly ⑥ and DC motor ⑦.
- 4) Remove stopper washer ⑬ and remove worm wheel ⑩ from shaft ⑧.
- 5) Remove the solder of the two cords ⑪ coming out from the DC motor ⑦ and remove the DC motor ⑦ from the mechanical chassis.

#### 2. Installation

- 1) Solder the two cords coming out from the DC motor ⑦ which is shown in Fig. A, to the two points as shown in Fig.
- 2) Apply 1/3 drop of oil onto shaft ⑧ and install a worm wheel A ⑩.
- 3) Apply a size of one rice grain of grease to worm ⑨.
- 4) Install motor holder assembly ⑥ and DC motor ⑦.
- 5) Install motor holder assembly ⑥ to pin ⑫ of the mechanical chassis by matching the hole of it.
- 6) Tighten the screws ③, ② and ① in that order.

#### Note:

- Be sure to perform the soldering at 260°C within 5 seconds.
- Pull out the cord coming from the DC motor ⑦ lest it should sag over the chassis.

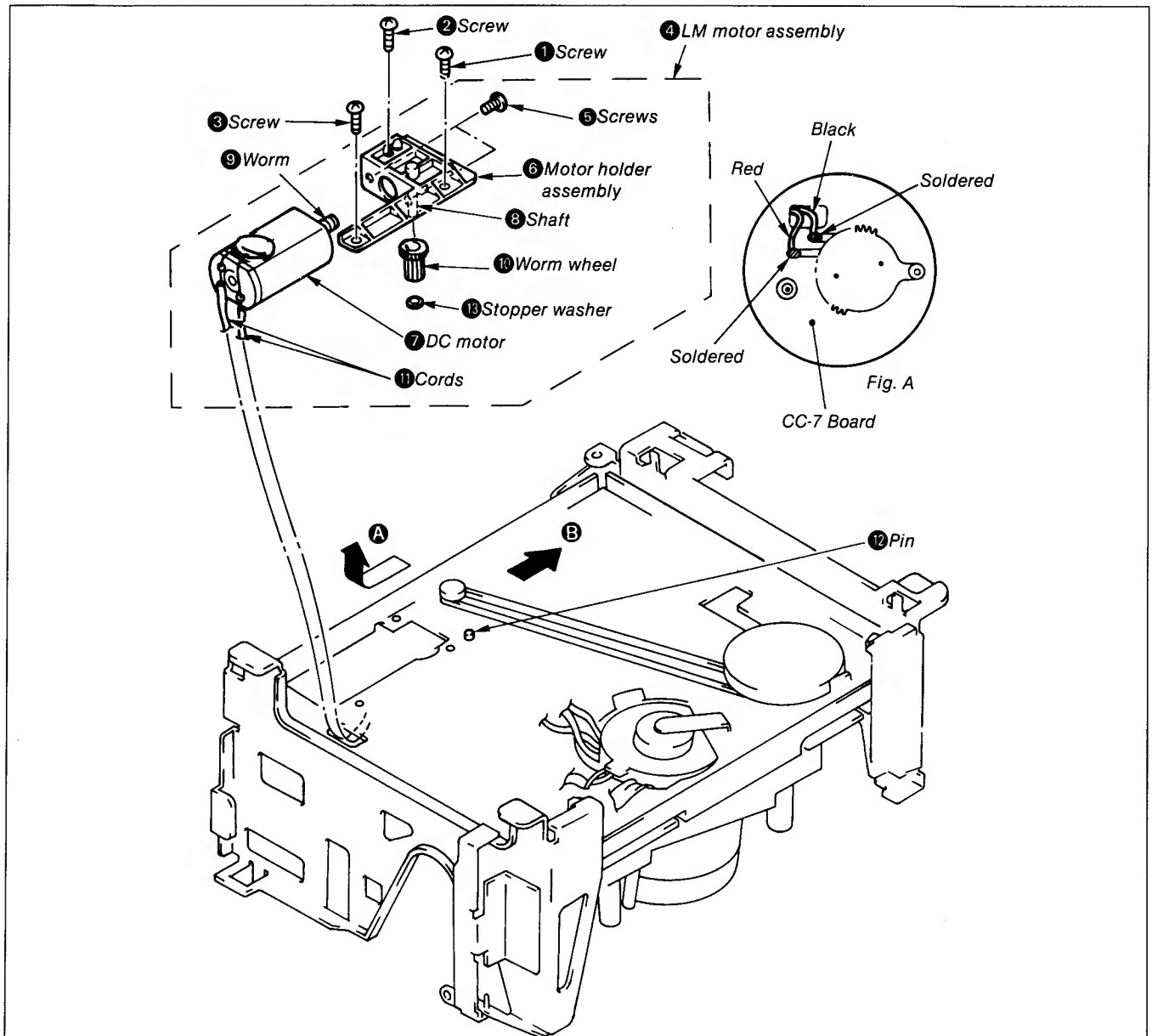


Fig. 8-34.



### 8-3-22. Capstan Motor Assembly (See Fig. 8-35)

#### 1. Removal

- 1) By referring Section 2 DISASSEMBLY, 2-6 opening the SS-70 board.
- 2) Remove screws ① and ②, and remove capstan motor assembly ⑤.
- 3) Remove stopper washer ⑥ and conversion gear assembly ⑦, and remove relay belt ③.

#### Note:

Do not touch the capstan motor shaft marked with \* oil seal marked with \* and rotor marked with \*.

#### 2. Installation

- 1) As shown in Fig. A. apply over 1/3 drop and below 1/2 drop of oil to the arrow marked point of shaft ⑧.

- 2) Install conversion gear assembly ⑦ to shaft ⑧ while applying relay belt ③ to the assembly.
- 3) Install stopper washer ⑥.
- 4) Install capstan motor assembly ⑤ to mechanical chassis while applying relay belt ③ to pulley ④.
- 5) Be sure to confirm that the capstan motor and mechanical chassis become horizontal, and install them with screws ① and ② successively in that order.

#### Notes:

- 1) Be sure to confirm that stopper washer ⑥ is being set completely into the groove of shaft ⑧.
- 2) Care should be taken so as not to leave the relay belt ③ in the stretched state.

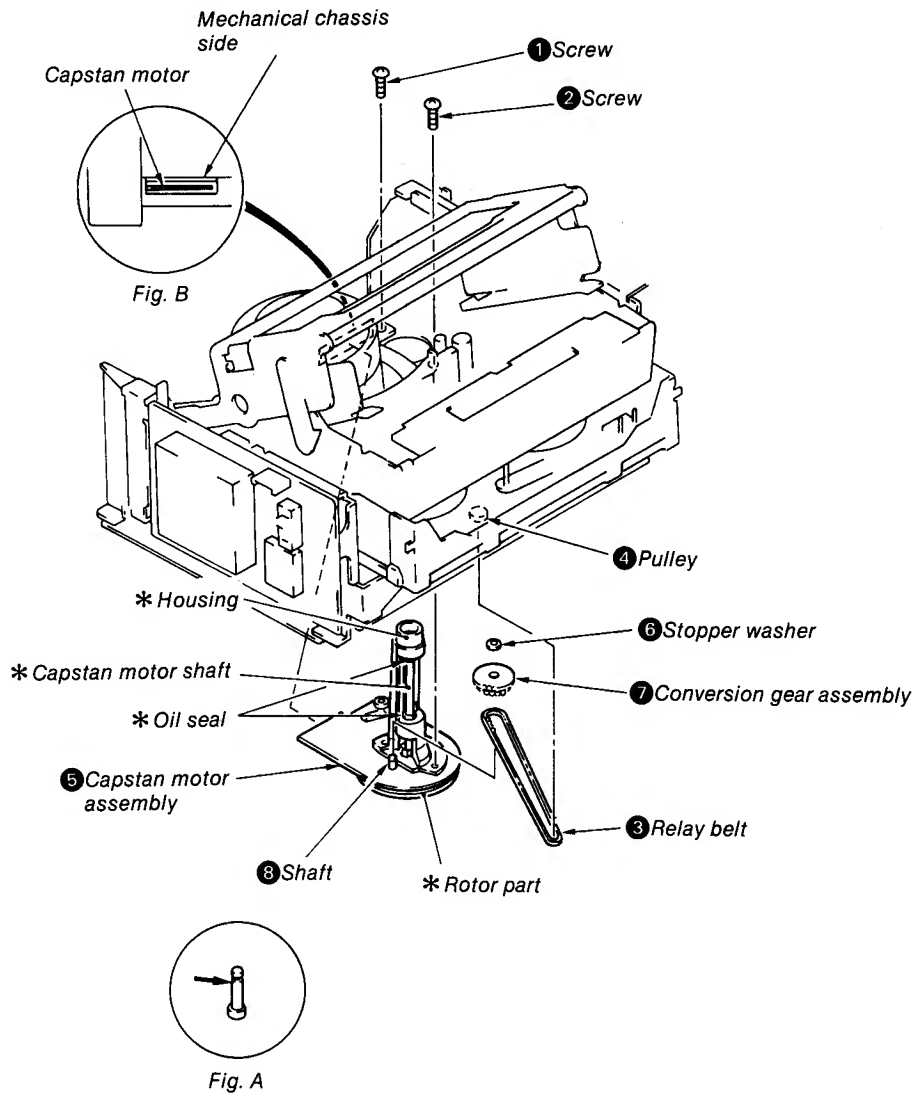


Fig. 8-35.

### 8-3-23. TG-2 (See Fig. 8-36)

#### 1. Removal

- 1) Remove TG-2 nut ①.
- 2) Remove upper flange receptacle ②, TG-2 flange ③, TG-2 roller ④, TG-2 sleeve ⑤, TG-2 flange ⑥, TG-2 lower flange receptacle ⑦ and pressure coil spring ⑧.

#### Notes:

- 1) When removing TG-2 nut ①, taken precautions not to scatter the parts which are being pressed by the pressure coil spring ⑧.
- 2) Be sure to use gloves when installing and removing TG-2 flange ③ and TG-2 roller ④.

#### 2. Installation

- 1) Install pressure coil spring ⑧, Upper flange receptacle ⑦, TG-2 lower flange ⑥, TG-2 sleeve ⑤, TG-2 roller ④, TG-2 flange ③ and upper flange receptacle ②.

- 2) Install TG-2 nut ①.
- 3) Perform TG-2 height preset.

#### 3. TG-2 height preset

- 1) Push up upper flange receptacle ⑨ in the direction of arrow as shown in Fig. A.
- 2) Screw TG-2 nut ① into TG-2 shaft ⑩ until slit part height becomes the same level of the upper surface of TG-2 shaft ⑩.
- 3) Rotate TG-2 nut ① 1/2 times in the direction of arrow as shown in Fig. B.

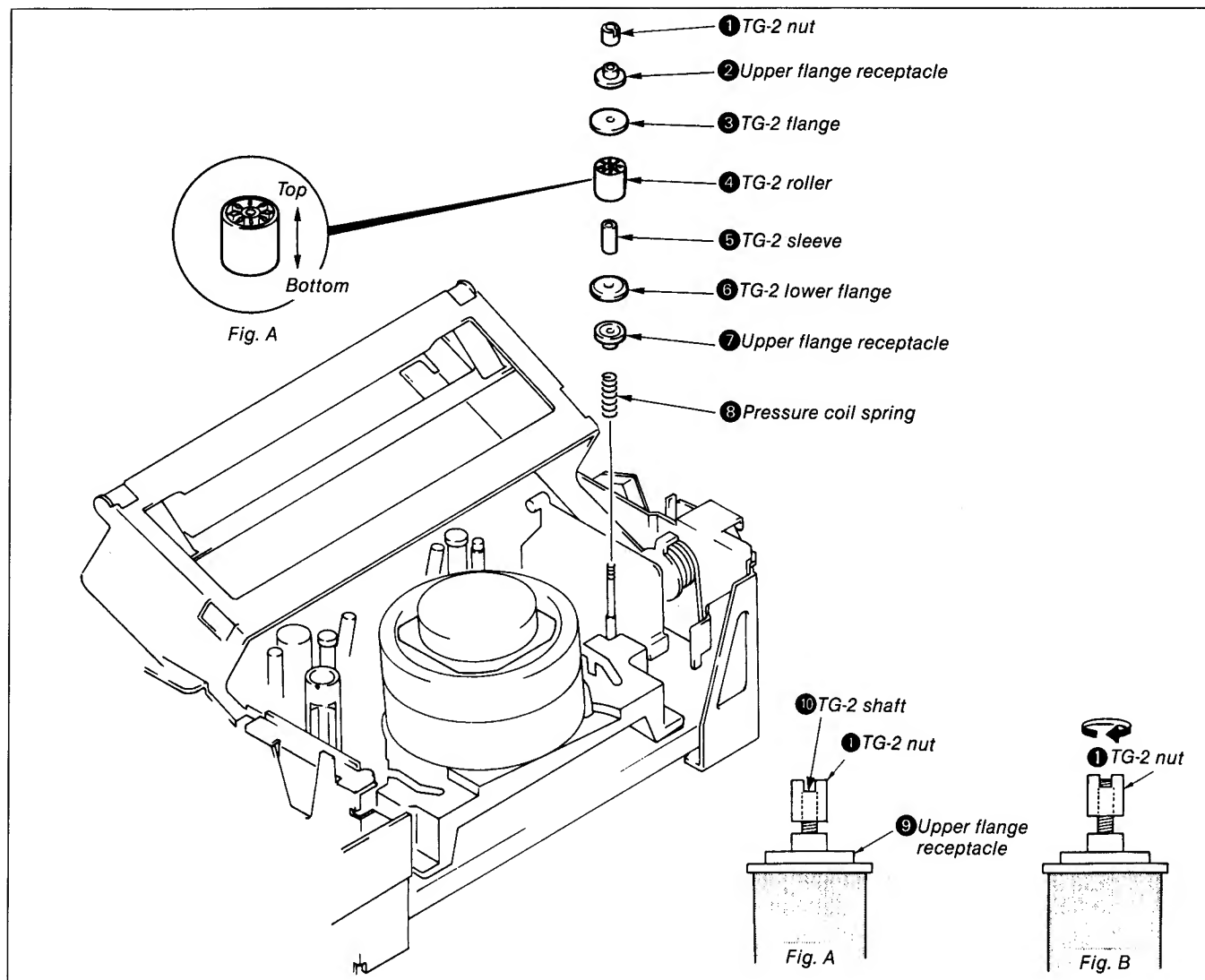


Fig. 8-36.

### 8-3-24. Drum Unit (See Fig. 8-37)

#### 1. Removal

- 1) Turn into **EJECT** mode.
- 2) By referring, Section 2 DISASSEMBLY, 8-6 open SS-70 board and remove two connectors ①.
- 3) Remove two connectors ② from MR-8 board.
- 4) Remove two screws ③ and a screw ④, and remove drum base ⑤ and dew condensation sensor ⑥.
- 5) Remove three screws ⑦ and three washers ⑧, and remove drum unit ⑧.

#### 2. Installation

- 1) Install drum unit ⑧ to drum base ⑤ and set three screws ⑦.

- 2) Mount drum base ⑤ on the mechanical chassis and secure it with two screws ③.

- 3) Tighten dew condensation sensor ⑥ and drum base ⑤ with screw ④.

#### Note:

Be sure not to use screws ③ and ④ again after they have once been loosened.

- 4) Apply molten grease to the arrow marked point, as shown in Fig. A.

- 5) Install two connectors ① to SS-70 board.

- 6) Install two connector ② to MR-8 board.

- 7) By referring, Section 2 DISASSEMBLY, 2-6, install SS-70 board.

- 8) Perform tape path adjustment in item 8-4.

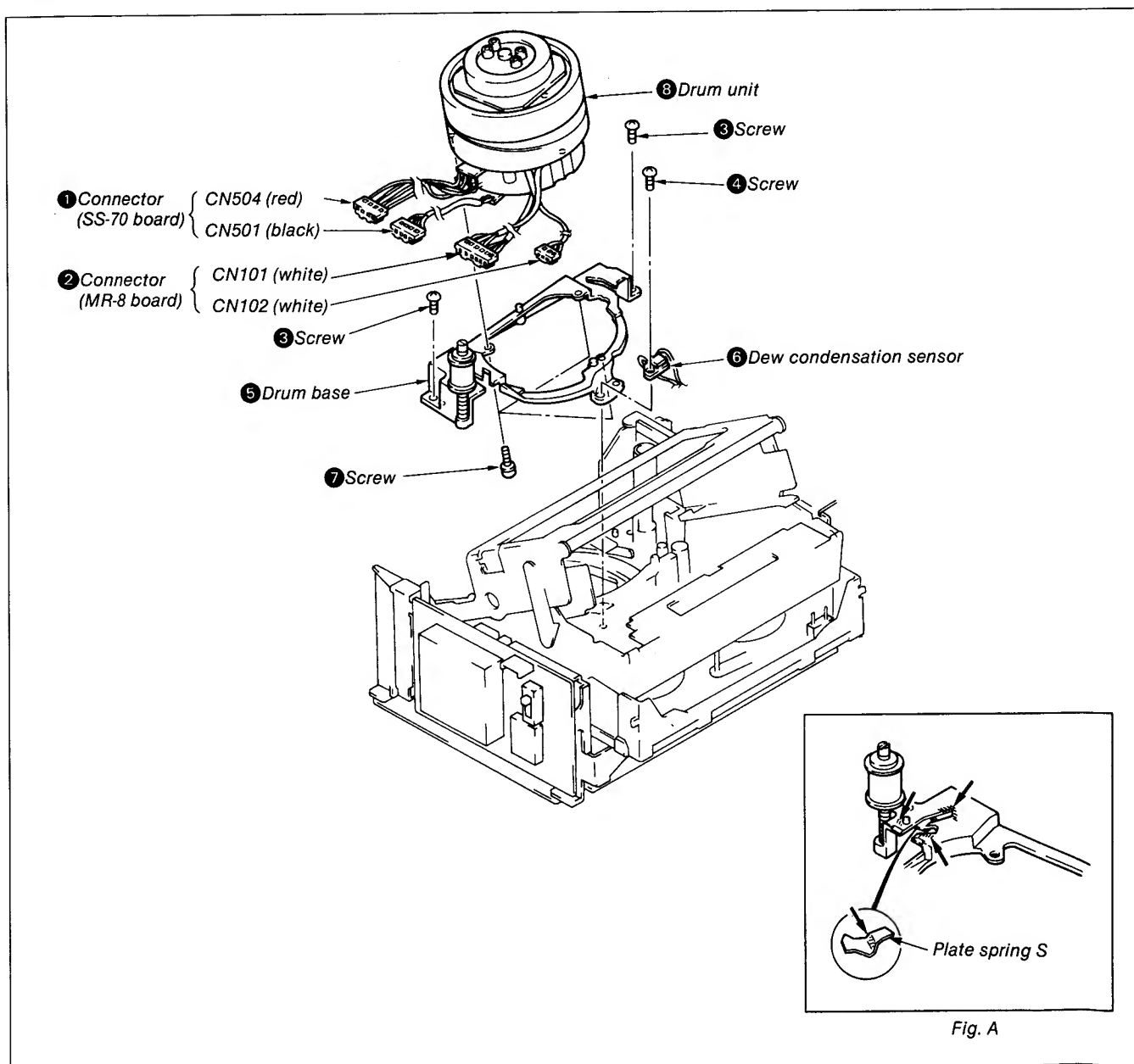


Fig. 8-37.

### 8-3-25. Replacement of Rotary Upper Drum

#### 1. Removal

- If video recording is possible, make video recording prior to the removal.

- 1) Remove two hexagonal socket head cap screws ❶ and damper ❷.
- 2) Remove all the six points of soldering in **a** section, and confirm that the board and pins which are projected from the lower side of the board can be moved freely by touching with tweezers, etc.
- 3) Remove two hexagonal socket head cap screws ❸. (See Fig. 8-39)
- 4) Install jig ❹ (Ref No. J-10) with the attached two screws ❺ into the screw hole where the damper ❷ had been installed and twist the attached hexagonal socket head cap screw ❻ into jig ❹. By doing so, the rotary drum becomes floated to the top side and this acts to remove the rotary upper drum ❼. (See Fig. 8-38.)

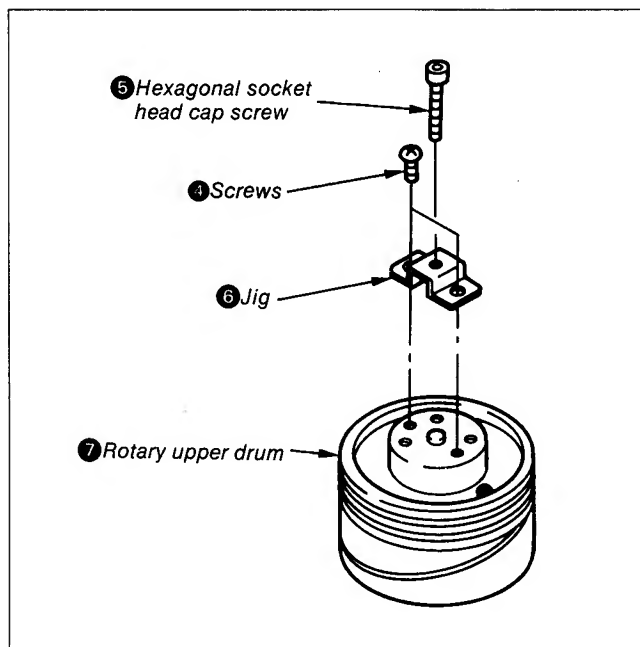


Fig. 8-38.

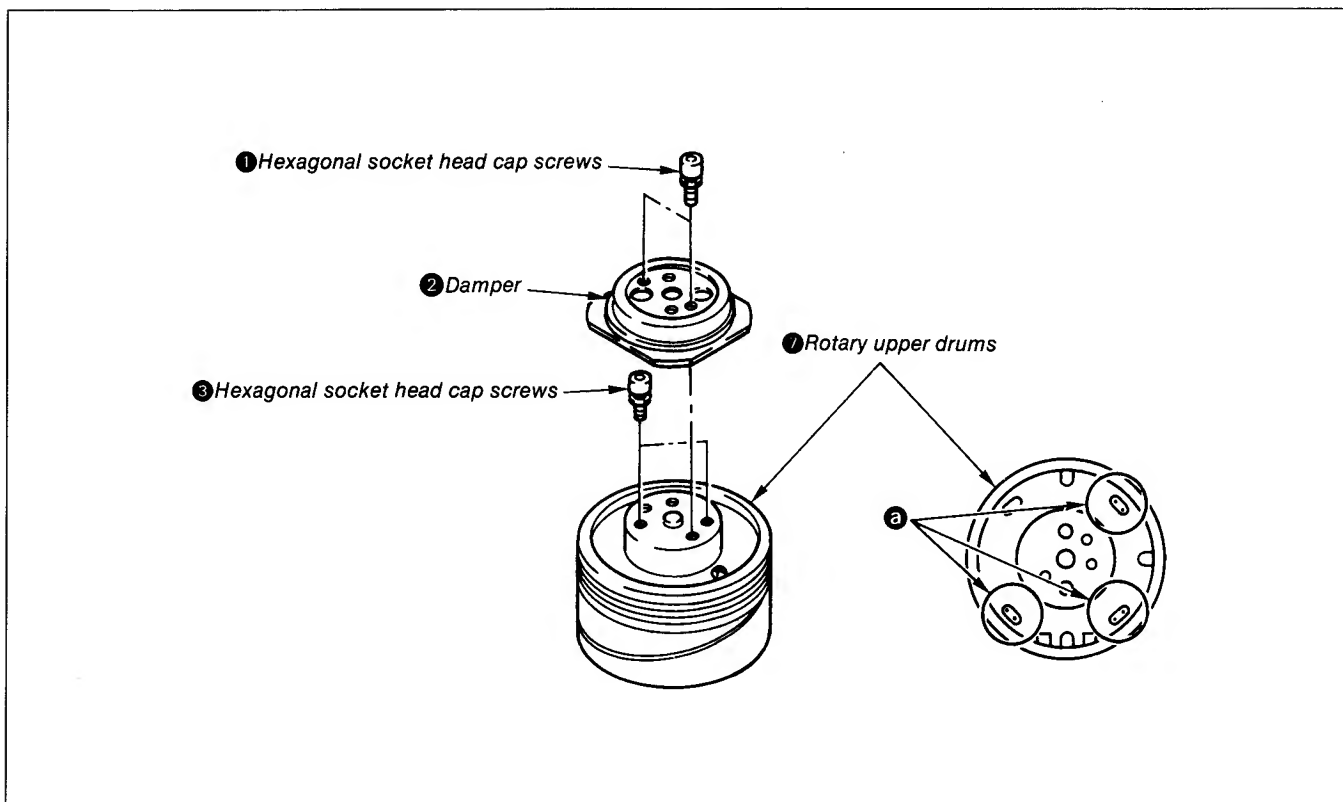


Fig. 8-39.

## 2. Installation

- 1) Perform cleaning of flange surface and rotary upper drum ⑦ surface which are contacted to it, and confirm that there are no dust and flaws.
- 2) Insert jig ⑨ (Ref No. J-10) of the rotary upper drum ⑦ into the position determining hole and set it lightly to the rotary upper drum.

### Note:

At this point, be sure to confirm that pin ⑩ appears from the hole of the board on which the rotary upper drum is mounted. (Fig. 8-40).

- 3) Remove jig ⑨ from upper rotary drum ⑦ and push it gently into lower one manually. However, when it cannot be inserted thoroughly, tighten two hexagonal socket head cap screws ③ alternately to secure it temporarily.
- 4) Insert jig ⑨ again into position determining holes ⑧, and be sure to confirm that it can be inserted smoothly. When it cannot be inserted, loosen 2 hexagonal socket head cap screws ③, and by referring to Removal 3), set it again.
- 5) Tighten 2 hexagonal socket head cap screws ③.
- 6) Solder pin ⑩ of a section.

### Note:

At this point, be sure not to let the soldering flow underneath the board.

- 7) Install damper ② with two hexagonal socket head cap screws ①.

### Notes:

- 1) Be sure not to tighten too strongly.
- 2) When performing installation, special care should be taken so as not to mistake the hexagonal socket head cap screws ③ (2 × 5) with that of ① (2 × 2.7).
- 3) Be sure to perform 8-4 tape path adjustment after installation.

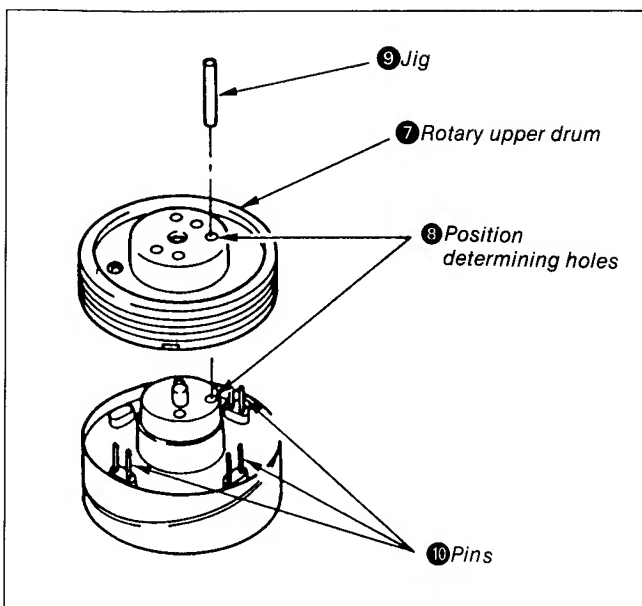


Fig. 8-40.

## 8-3-26. Reel Table Height Check (See Fig. 8-41)

### 1. Removal

- 1) By referring to 8-1-1 and 8-1-2, remove cassette arm assembly and LS cassette compartment assembly.
- 2) By referring to 8-3-1, remove reel lock lever.
- 3) By referring to 8-3-2, remove pendulum stopper plate.

### 2. Checking

- 1) Confirm by using calipers, etc., so that the heights from LS chassis ① to S reel table reel receptacle plate surface ② and from LS chassis to T reel table reel receptacle plate surface ③ should respectively be  $6.85 \pm 0.15\text{mm}$ .

### 3. Installation

- 1) By referring to 8-3-2, install pendulum stopper plate.
- 2) By referring to 8-3-1, install reel lock lever assembly.
- 3) By referring to 8-1-1 and 8-1-2, install cassette arm assembly and LS cassette compartment assembly.

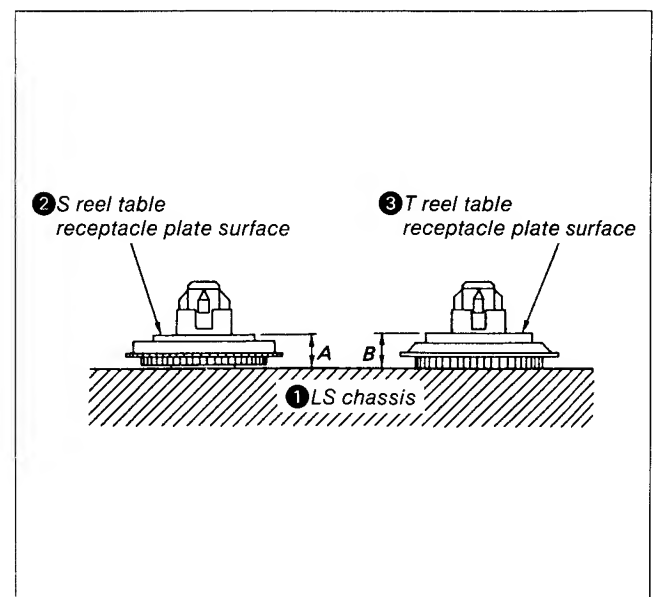


Fig. 8-41.

## 8-3-27 FWD/RVS Torque Check

- 1) Set the FWD and RVS take up torque cassette (Ref. No. J-9).
- 2) Turn into **FWD** mode, and confirm torque value at the T reel side becomes 11 gcm to 19 gcm.
- 3) Turn into **REC REVIEW** mode, and confirm torque value at the S reel side becomes 20 gcm to 32 gcm.
- 4) In the event the above-mentioned value are not indicated, be sure to replace the individual reel tables.

### 8-3-28 Tension Regulator Position Adjustment

#### 1. Removal

- 1) By referring to 8-1-1 and 8-1-2, remove cassette arm assembly and LS cassette compartment assembly.

#### 2. Adjustment

- 1) Set a cassette tape and turn into **REC** mode and run the tape. (See Fig. 8-1-4)
- 2) In tape running state, confirm whether the arrow marked **A** point is positioned at the point (arrow mark **B**)  $1/3$  within the thickness of LS guide **2** or not. (See Fig. 8-42)
- 3) When it is not at the specified position, remove the cassette and perform the adjustments described in after step 4).
- 4) Loosen screw **3**.
- 5) If TG-1 arm assembly **1** is within the inner side than the specified position, shift the tension regulating band plate **4** slightly in the direction of arrow **C**. If it is in the outer side, shift it slightly in the direction of arrow **D** and secure it with screw **3**. (See Fig. 8-43)

#### Notes:

- 1) Use a cassette tape which has been forwarded to about the middle section.
- 2) Perform steps 4) and 5) after extracting cassette tape.

#### 3. Installation

By referring to 8-1-1 and 8-1-2, install cassette arm assembly and LS cassette compartment assembly.

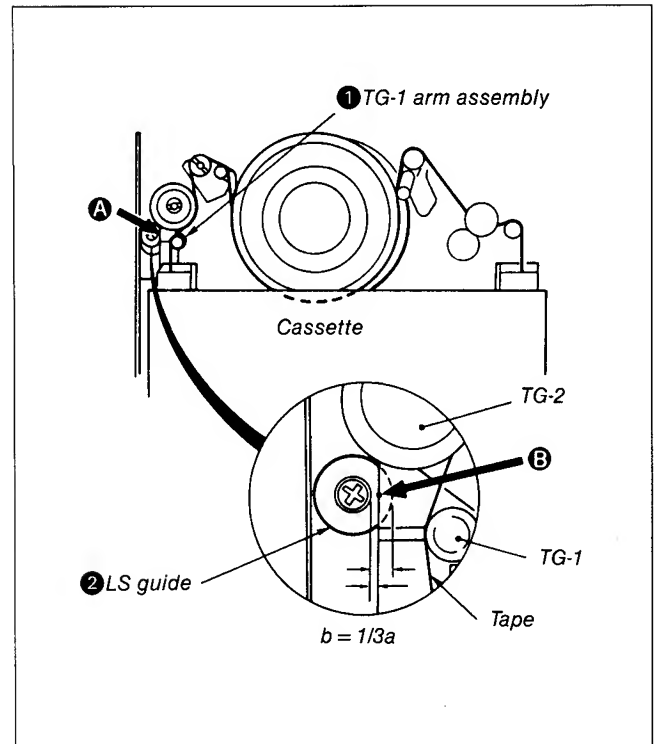


Fig. 8-42.

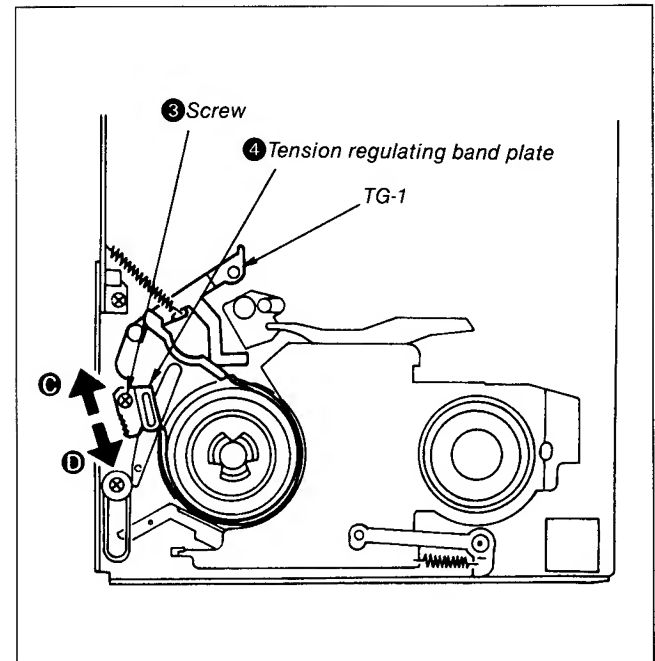


Fig. 8-43.



### 8-3-29. FWD Back Tension Adjustment

#### 1. Removal

By referring to 8-1-1 and 8-1-2, remove cassette arm assembly.

#### 2. Adjustment

- 1) Turn into **REC** mode.
- 2) Set the tension measuring exclusive reel (Ref. No. J-7) ①.
- 3) Measure tape tension of the outgoing side by using dial tension gauge (Ref. No. J-6) ②. At this point, the measurement should be conducted by pulling the tape at the speed of 14mm/sec. (See Fig. 8-44)
- 4) Move spring hooking position ④ of tension regulating spring ③ so that the tension applied becomes within the range of 6.9 to 7.9g. (See Fig. 8-45)

#### 3. Installation

- 1) By referring to 8-1-1 and 8-1-2, install cassette arm assembly and LS cassette compartment assembly.

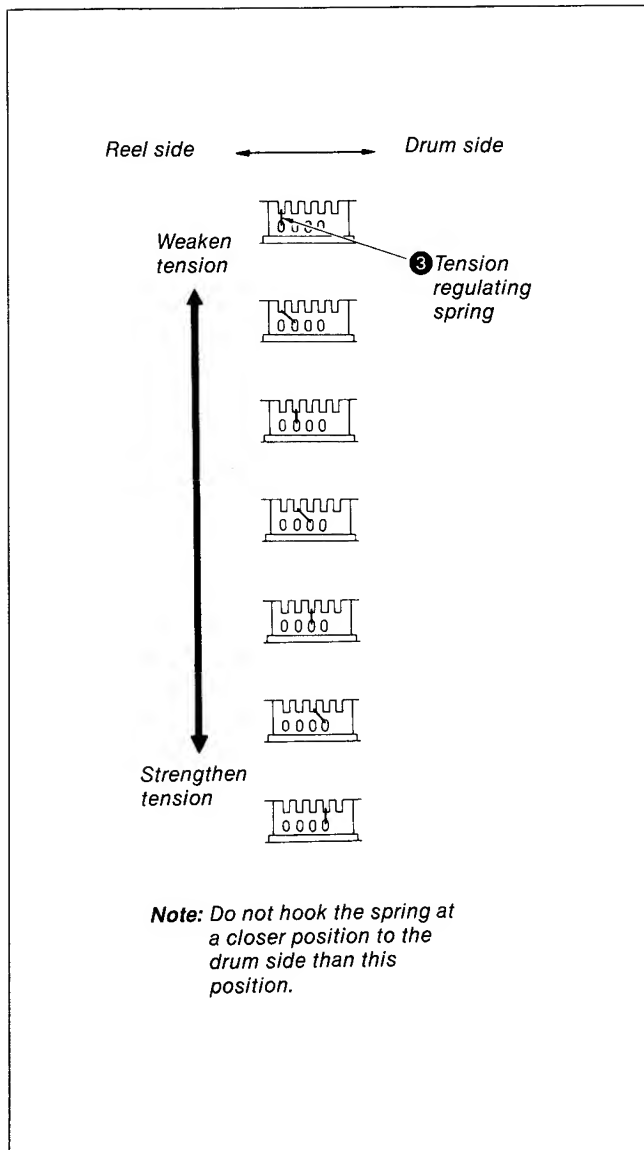


Fig. 8-44.

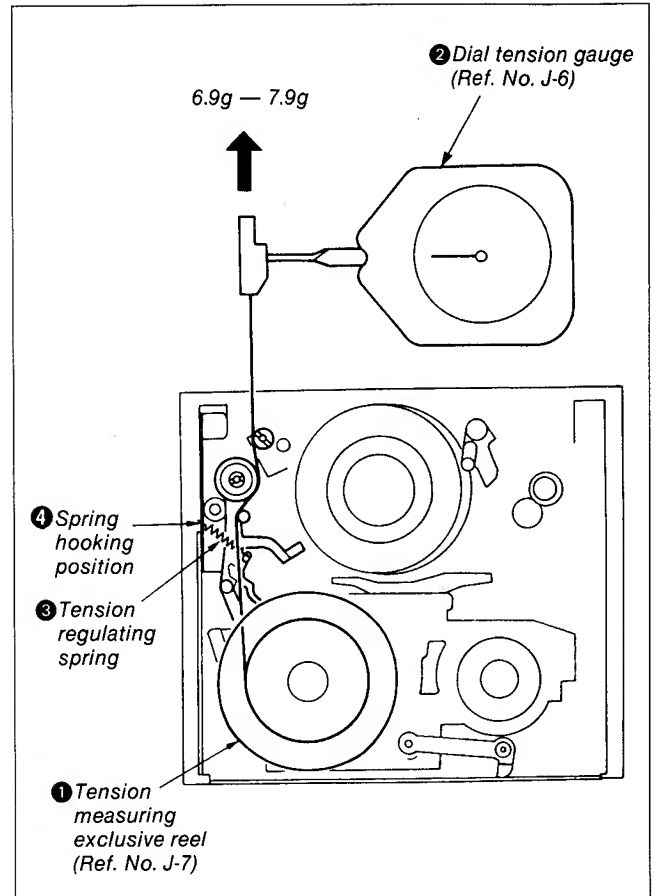


Fig. 8-45.

### 8-3-30. TS Gear Assembly (Refer to Fig. 8-46)

#### 1. Removal

- 1) By referring to 8-1-1 and 8-1-2, remove cassette arm assembly and LS cassette compartment assembly.
- 2) By referring to 8-3-1, remove reel lock lever assembly.
- 3) By referring to 8-3-2, remove the pendulum stopper plate.
- 4) By referring to 8-3-4, remove the T reel table assembly.
- 5) Remove TS gear assembly ❶.

#### 2. Installation

- 1) Install TS gear assembly ❶ to shaft ❷.
- 2) By referring to 8-3-4, install T reel table assembly.
- 3) By referring to 8-3-2, install pendulum stopper plate.
- 4) By referring to 8-3-1, install reel lock lever assembly.
- 5) By referring to 8-1-1 and 8-1-2, install cassette arm assembly and LS cassette compartment assembly.

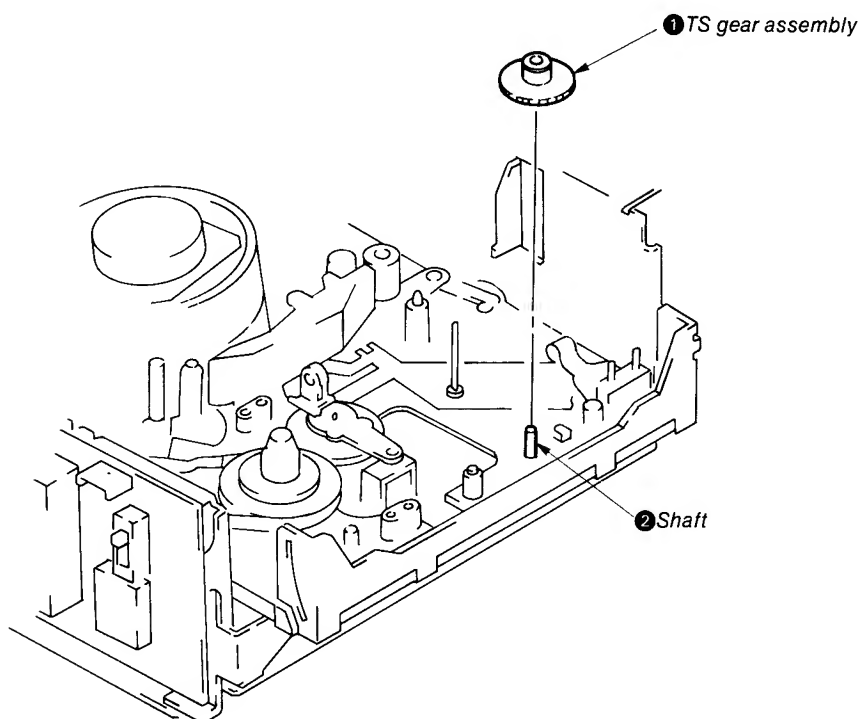


Fig. 8-46.

#### 8-4. TAPE PATH ADJUSTMENT

- Perform this adjustment after confirming that the electrical adjustment has been completed.

#### REGARDING TRACK SHIFT & MONITOR JIG

The video 8 system employs a high precision tracking ATF (automatic track finding) and instantaneously controls the tape running speed with the four kinds pilot signals. In this way, the tracking adjustment knob becomes unnecessary, and accurate tracing has become possible.

However, on the other hand, there has been difficulty in adjusting the tape path system with the ATF method. It was due to the fact that complete adjustment had been impossible to be performed because even when the tracing of the head had been a slightly off course, the ATF would perform correction automatically.

Because of this, adjustment is carried out to the tape path system by using the track shift & monitor jig (Ref. No J-6080-843-A). As the track shift and monitor jig forcibly releases the ATF and sets the tracking amount (track shift) manually, the adjustment of the tape path system can easily be carried out.

- Perform this adjustment after the Section 7, camera adjustments and Section 9, video adjustments have been completed.

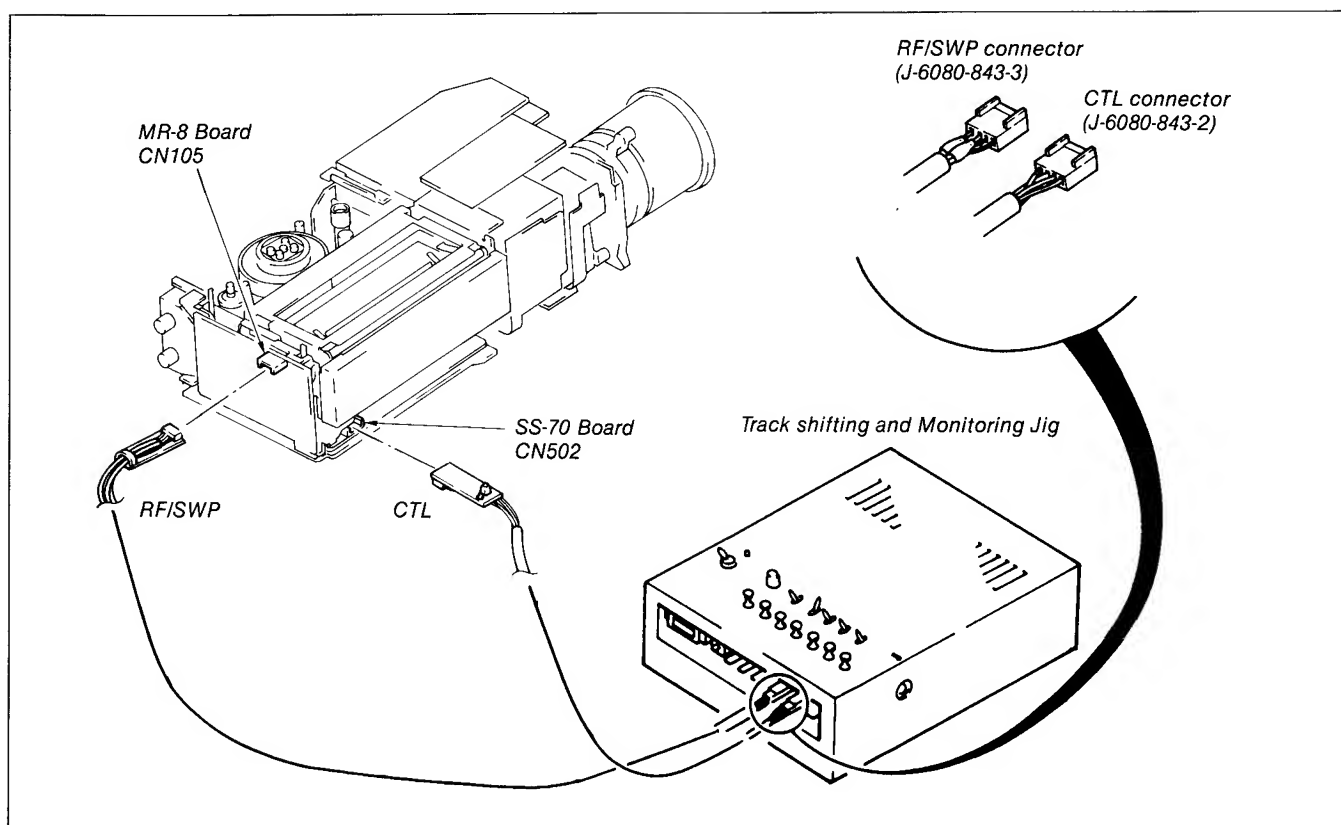


Fig. 8-50.

#### 8-4-1. TRACK SHIFTING AND MONITORING JIG CONNECTING PROCEDURE

- 1) Supply power to Power Supply Connector (PS IN) as follows:

SYSTEM CONN: Connect the AC-V8E/UB on that has been modified by paragraph 4) Modifying Procedure.

AC ADP: Connect an AC adapter AC-M100E/AC-M110E/AC-M100UB for Beta movie.

REG: Connect a commercially available 12V 3A regulated DC power supply on.

Connect Blue Clip to its (+) positive end and Black Clip to its (-) negative end (GND), and operate it at about 8V. (Extension code: Ref No. J-18)

##### Note:

Priorities have been assigned to the three above connectors, where SYSTEM CONN carries the highest priority and REG the lowest.

Accordingly, even where they have been connected on together, power will be supplied to SYSTEM CONN.

- 2) Connection of the connector (See Fig. 8-50)

RF/SWP .... The connector which picks up the RF signals of the RF SW PULSE and CH1 and CH2 of the drum head, and it connects the RF/SWP and CN105 on the MR-8 board. (Ref No. J-17)

CTL ..... The connector to supply the SEL and ATF LOCK signals and it connects the CTL and CN502 on the SS-70 board. (Ref No. J-17)

Other connectors than the above are not used in this set.

- 3) Setting of the individual switches

SEL ..... Turn the SEL "ON" when performing track shift. When it is turned "OFF", it becomes the control on the set side being connected.

PATTERN ... Set to the EV side.

ATF LOCK ..

Turn it "OFF".

Other switches than the above are not used in this set.

- 4) AC-V8E/UB (AC Adapter for CCD-V8E) Modifying Procedure

- i) Remove two screws ① and two screws ②, and dismount Upper Housing (see Fig. 8-51)
- ii) Short pins ⑮ and ⑰ of IC5 on SB-F Board by soldering lead wire, etc. (See Fig. 8-52)
- iii) Mount Upper Housing back on, and tighten two screws ① and two screws ② (See Fig. 8-51).

##### Notes:

- When connecting AC-V8E/UB to Track Shifting and Monitoring Jig, be sure to modify it by the above steps in advance.
- When power is supplied with a modified AC-V8E/UB, a little pushing the AC-V8E/UB switch off.

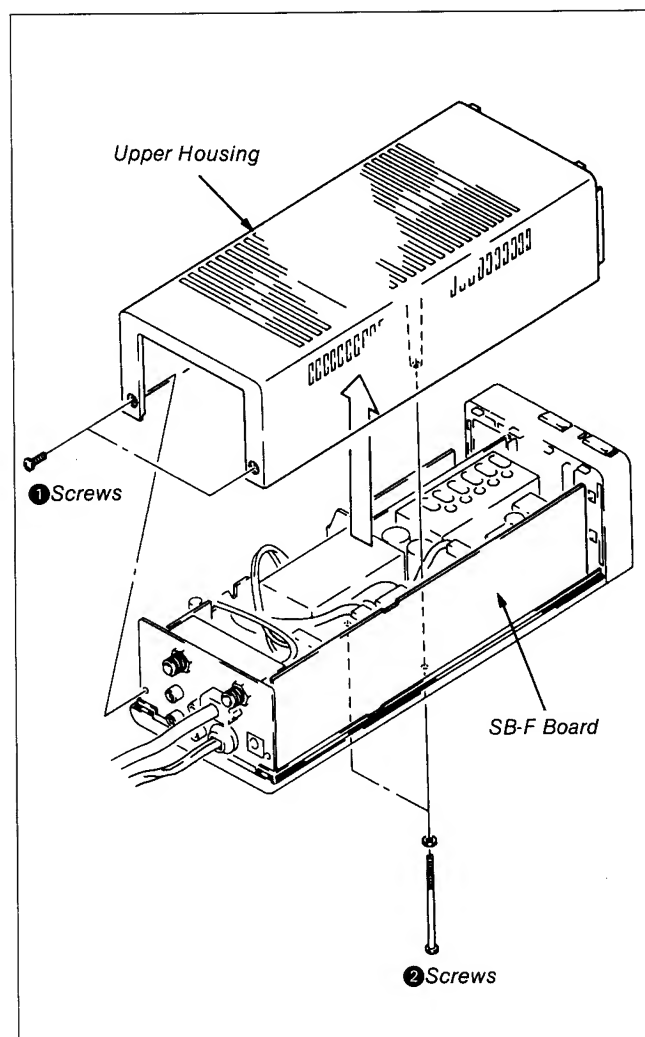


Fig. 8-51.

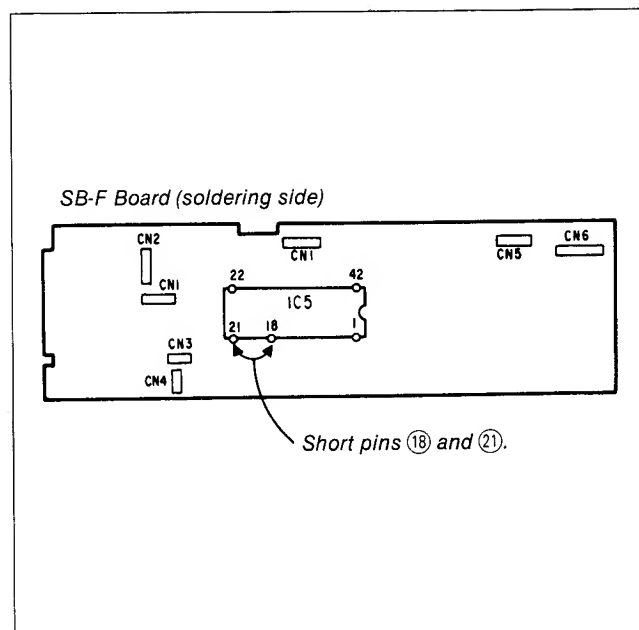


Fig. 8-52.

### 8-4-2. Preparation for Adjustment

- 1) Clean the tape running surfaces (tape guide, drum, capstan shaft, pinch roller).
- 2) Referring to 8-4-1 Connection Diagram of Track Shift & Monitor Jig, connect the track shift & monitor jig and set the jig switch.
- 3) Connect the oscilloscope.  
1CH: CN2 terminal of the track shift & monitor jig (output of the CH2 head)  
2CH: RF SWP terminal of the track shift & monitor jig (external trigger)
- 4) Playback the tracking alignment tape (WR5-1C)
- 5) Turn the track shift knob of the track shift & monitor jig to maximize the amplitude of a RF waveform. (Refer to Fig. 8-53.) When the RF waveform is unstable and difficult to adjust, made adjustment after turning on the ATF LOCK switch. Then, return it to "OFF" after adjustment.

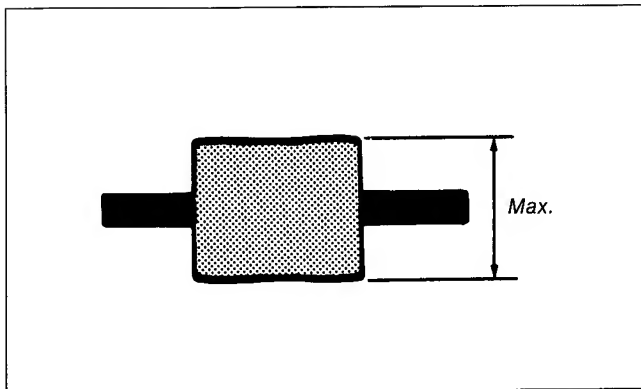


Fig. 8-53.

- 6) Confirm that the RF waveform of the oscilloscope is flat at both inlet and outlet sides. (Refer to Fig. 8-54 (a).) When it is not flat, adjust as follows:
  - When the RF waveform at the inlet/outlet side is not flat; (Refer to Fig. 8-54 (b) or (c).) After making tracking coarse adjustment in 8-4-3, make tracking fine adjustment in 8-4-4.

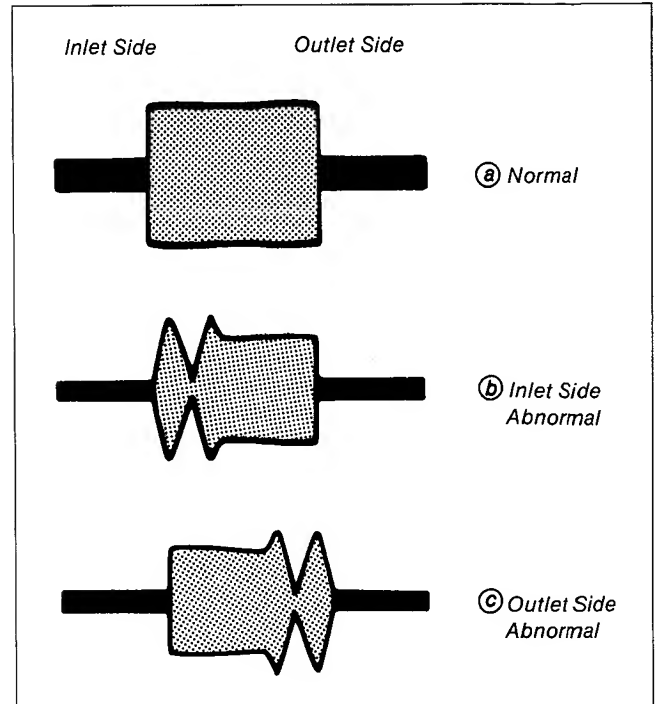


Fig. 8-54.

- 7) When the RF waveform is normal, proceed to 8-4-8 checks after Adjustment.

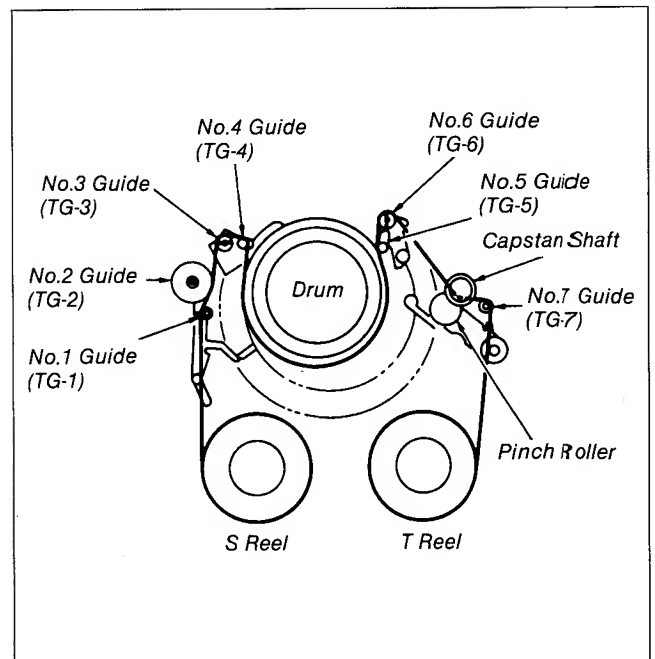


Fig. 8-55.

#### 8-4-3. Tracking Coarse Adjustment

- 1) Playback the tracking alignment tape.
- 2) Turn the track shift knob of the track shift & monitor jig to maximize the amplitude of the RF waveform. (Refer to Fig. 8-53.)
- 3) Loosen the lock screw ❶ of the No. 3 guide (TG-3) and turn the No.3 guide to make flat the waveform at the inlet side. (Refer to Fig. 8-56.)
- 4) Loosen the lock screw ❷ of the No.6 guide (TG-6) and turn the No.6 guide to make flat the waveform at the outlet side. (Refer to Fig. 8-57.)

**Note:**

Be careful not to loosen the lock screw too much because the guide will be easily moved.

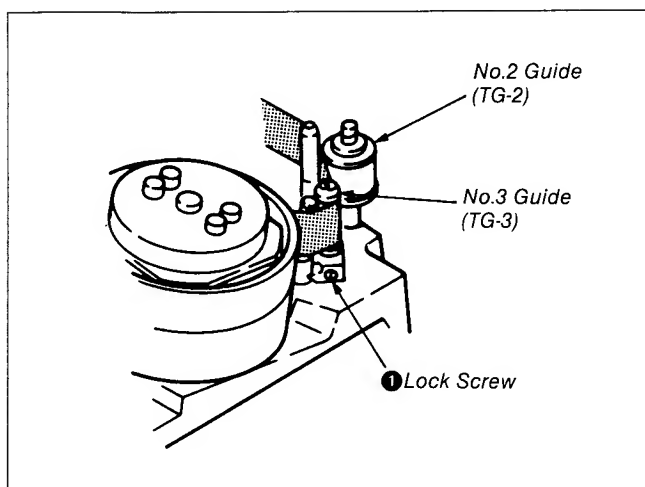


Fig. 8-56.

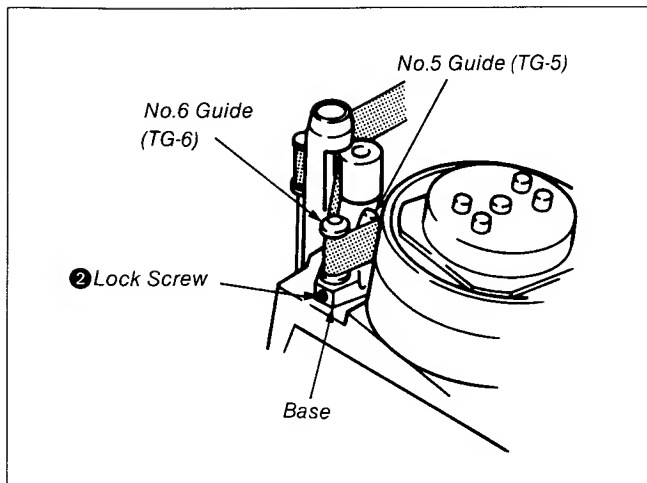


Fig. 8-57.

#### 8-4-4. Tracking Fine Adjustment

- 1) Play back the tracking alignment tape, and turn the track shift knob of the track shift & monitor jig in the counter clockwise direction to adjust the amplitude of the RF waveform to two-thirds of its maximum. (Refer to Fig. 8-57.)

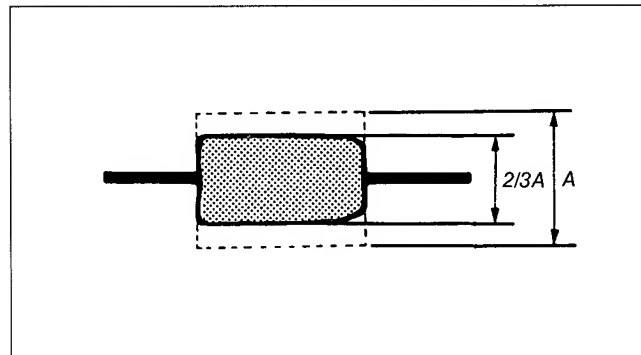


Fig. 8-58.

- 2) Confirm whether or not the waveform is flat. When it is not flat, turn the No.3 and No.6 guides (TG-3 and TG-6) to make it flat. (Refer to Fig. 8-56, 8-57)
- 3) Tighten the lock screw of the No.3 guide to lock it. When this is done, confirm that the waveform at the inlet side does not change.
- 4) Tighten the lock screw of the No.6 guide to lock it. When this is done, confirm that the waveform at the outlet side does not change.

**Note:**

When tightening the lock screw of the No.6 guide, turn the lock screw with the base gently held down lest the tip of the No.5 guide (TG-5) should touch the drum. (Refer to Fig. 8-57.)

#### 8-4-5. No.2 Guide (TG-2) Adjustment

When the No.2 guide is turned or replaced, adjust it after presetting a height.

- No.2 guide height presetting

- 1) Screw in until the slit of the TG-2 nut comes as high as the top of the TG-2 shaft. (Fig. 8-59 (a))

**Note:**

Preset the height after completely removing screw lock.

- 2) Turn the TG-2 nut 1/2 times in the clockwise direction. (Fig. 8-59 (b))

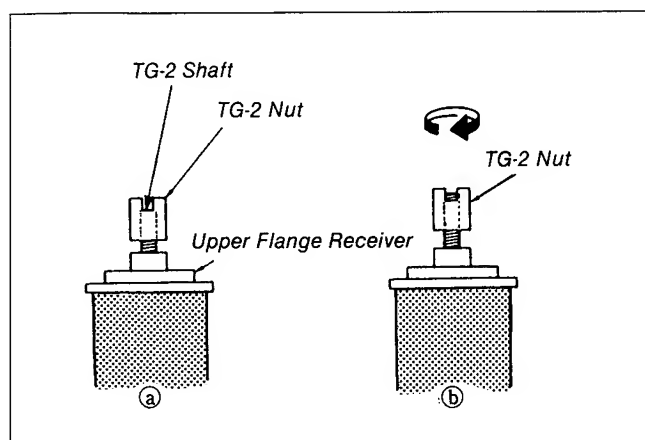


Fig. 8-59.

- No.2 guide (TG-2) adjustment

- 1) Play back the tracking alignment tape.
- 2) Turn off the SEL switch of the track shift & monitor jig.
- 3) Confirm the waveform in the **REV** mode. (Refer to Fig. 8-60.)

**Note:**

Make confirmation at the beginning of the alignment tape.

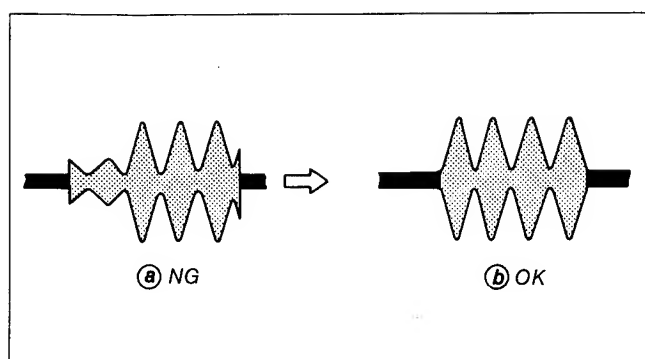


Fig. 8-60.

- When a normal waveform is not obtained (Fig. 8-60 a); Preset the No.2 guide height and go through the following adjustment:

- 4) Turn the TG-2 nut by 90° in the clockwise direction and take the step 3) again. Repeat the steps 3) and 4).  
At this time, confirm that the tracking waveform (Fig. 8-58) has not changed. If changed, make tracking fine adjustment at the inlet side and take the step 3) again.
- 5) Tighten the lock screw of the No.3 guide (TG-3). When this is done, confirm that the waveform at the inlet side does not change.
- 6) Apply screw lock to the No.2 guide (TG-2).

#### 8-4-6. No.7 Guide (TG-7) Adjustment

- 1) Play back the tracking alignment tape and select the REV mode.
- 2) Confirm that there is no tape deflection between the No.6 guide (TG-6) and capstan. (Refer to Fig. 8-61.) When the tape has a deflection, adjust to remove the deflection by turning the No.7 guide (TG-7).
- 3) Once again in the PLAYBACK mode, confirm that there is no tape deflection between the No.7 guide (TG-7) and capstan. (allowable tape deflection = less than 0.5mm)  
When the tape has a deflection, adjust to remove the deflection by turning the No.7 guide (TG-7).

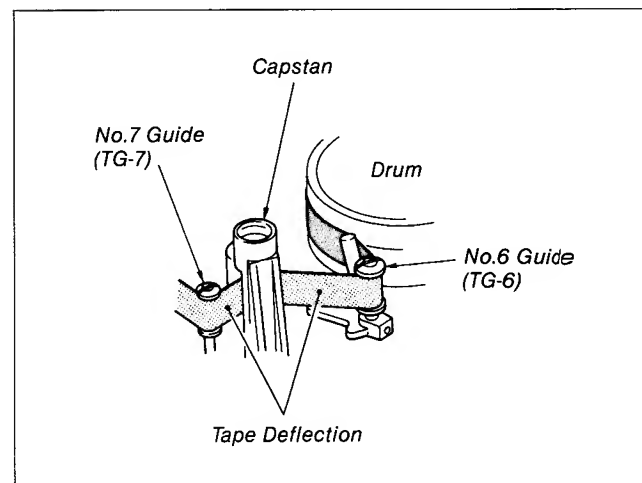


Fig. 8-61.



#### 8-4-7. CUE and REV Waveform Confirmation

- 1) Playback the tracking alignment tape and select the REV mode. At this time, waveform peak pitches should be uniform. (Refer to Fig. 8-62(a).)  
When they are not uniform, make tracking fine adjustment (8-4-4) and No.2 guide adjustment (8-4-5).
- 2) Select the CUE mode. At this time, waveform peak pitches should be uniform. (Refer to Fig. 8-62(b).) When they are not uniform, make tracking fine adjustment (8-4-4).

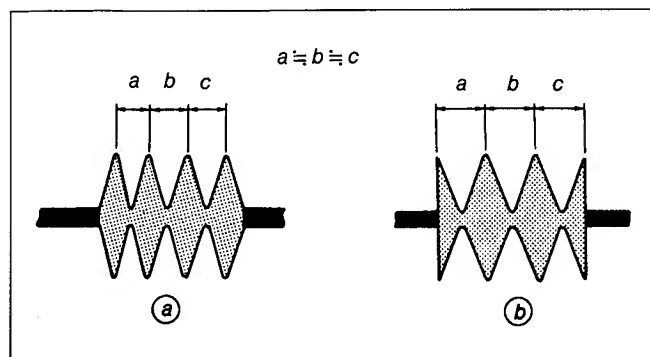


Fig. 8-62.

#### 8-4-8 Checks after Adjustment

##### 1. Tracking Check

- 1) Playback the tracking alignment tape. Turn the track shift knob of the track shift & monitor jig to adjust the amplitude of the RF waveform to two-thirds of its maximum. (Refer to Fig. 8-63.)
- 2) When this is done, confirm that an amplitude's minimum value ( $E_{MIN}$ ) is more than 80% of its maximum value ( $E_{MAX}$ ). (Refer to Fig. 8-64.)
- 3) Confirm that the waveform does not fluctuate greatly. (Refer to Fig. 8-65.)

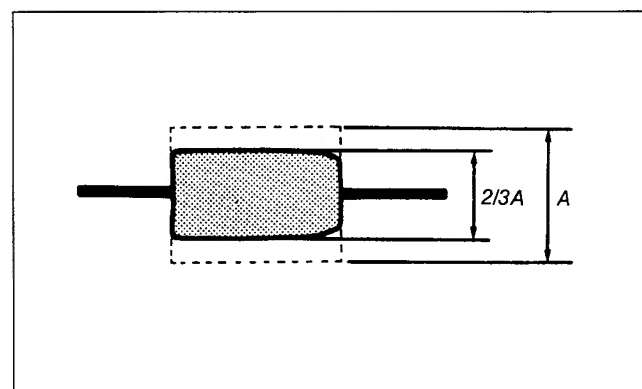


Fig. 8-63.

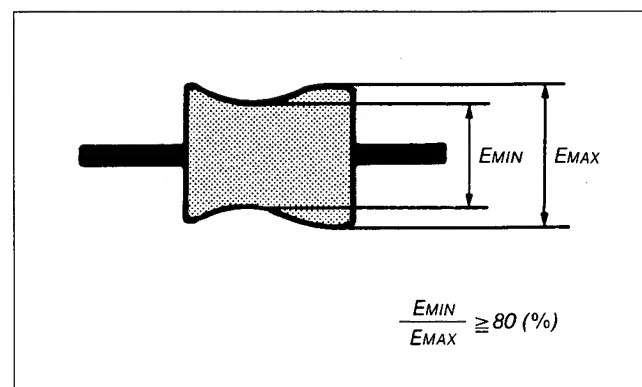


Fig. 8-64.

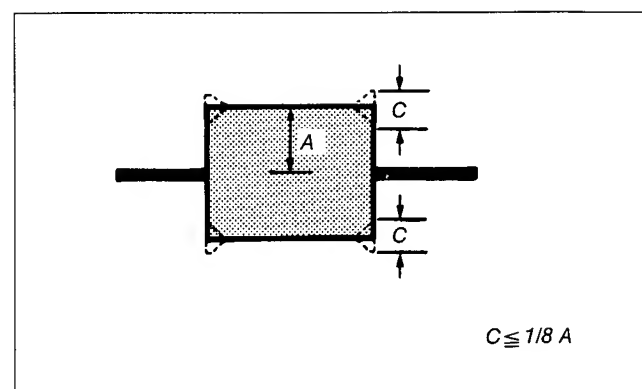


Fig. 8-65.

## 2. Rise Check

- 1) Playback the tracking alignment tape.
- 2) Turn the track shift knob of the track shift & monitor jig to maximize the amplitude of the RF waveform.
- 3) Eject the tape once, and then, load it again.
- 4) In the PLAYBACK mode, confirm that the RF waveform horizontally rises within 1 second. Confirm also at this time that there is no tape deflection around the pinch roller. (Refer to Fig. 8-66.)
- 5) Play back after CUE/REV and FF/REW, and confirm that the RF waveform horizontally rises within 1 second. Confirm also at this time that there is no tape deflection around the pinch roller.
- 6) Repeat the steps 3) through 5).

## 3. Tape Run Check

Select the PLAYBACK mode, and confirm that the No.2 guide lower flange, No.3 guide upper flange and No.6 guide upper flange have no clearance or large curl, and that the No.7 guide upper and lower flanges have no curl. (Refer to Fig. 8-67.)

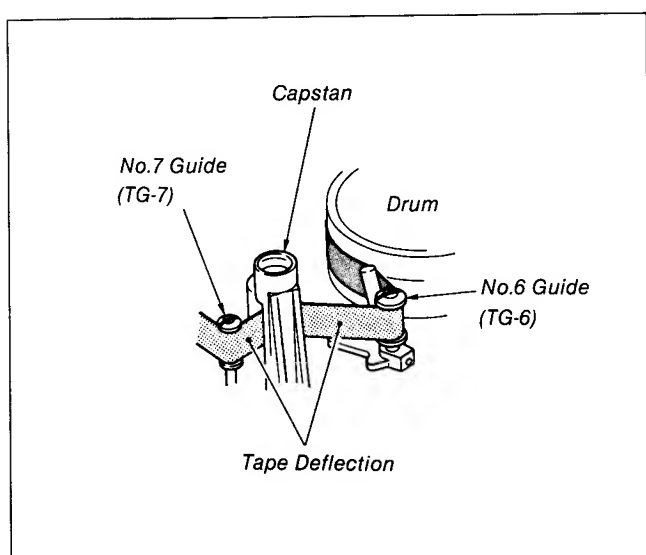


Fig. 8-66.

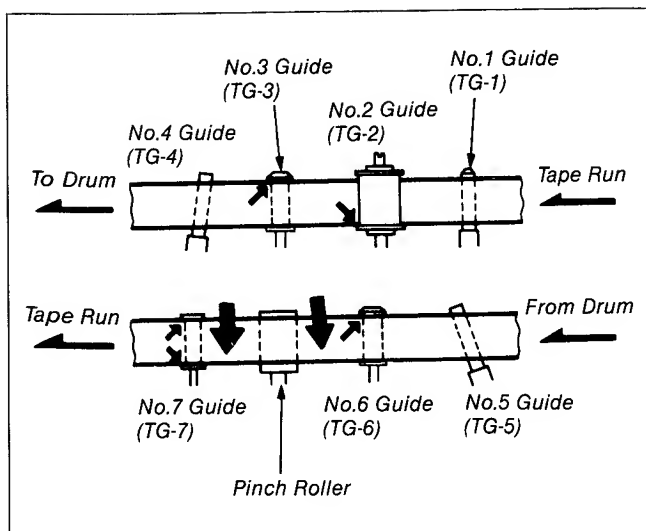


Fig. 8-67.

## SECTION 9 ELECTRICAL ADJUSTMENT (VIDEO SECTION)

During the adjustment see the parts location diagram relevant the adjustment on page 306.

The following measuring instruments are needed in adjusting the VTR section:

### [Equipment Required]

- 1) Monitor TV
- 2) AC pack
- 3) Oscilloscope Dual-trace, Bandwidth more than 10MHz with delay mode (Use a probe of 10:1, unless otherwise specified.)
- 4) Frequency Counter
- 5) Pattern generator with video output terminal
- 6) Digital voltmeter
- 7) Audio generator
- 8) Audio level meter
- 9) Audio distortion meter
- 10) Audio attenuator
- 11) Regulated DC power supply unit
- 12) Alignment Tape
  - Tracking adjustment (WR5-1C)  
Part code: 8-967-995-06
  - Video frequency response adjustment (WR5-2C)  
Part code: 8-967-995-16
  - Operation check (WR5-3CL)  
Part code: 8-967-995-36
  - Operation checking (WR5-3CSP)  
Part code: 8-967-995-27

### [Precautions for Adjustment]

The video section can be also adjusted with the camera section and EVF removed, excluding "Battery Failure Adjustment" in System Control Adjustment and "EVF display position adjustment" in Video System Adjustment. When removing the camera section and EVF section, disconnect the following 5 connectors:

1. MV-12 board: CN203 (black)
2. MV-12 board: CN206
3. MV-12 board: CN207 (EVF 8-pin socket)
4. RZ-1 board : CN251
5. SS-70 board : CN305 (white)

When the audio input section (MA-21 and MJ-12 boards) is unnecessary, remove the following connector:

1. SS-70 board: CN307 (white)

### [Equipment Connection]

Unless otherwise specified, adjustment is made by connecting the measuring instruments as shown in the figure below.

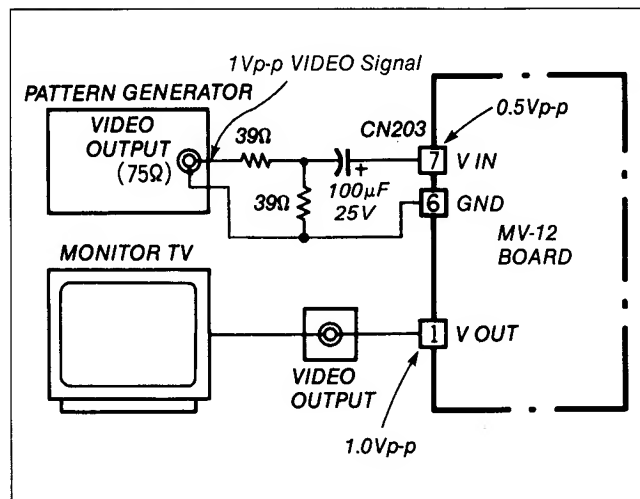


Fig. 9-1.

### [Set-up during adjustment]

Since the video output signal obtained from the pattern generator is used as the adjusting signal of the VTR block adjustment, it is necessary that this video output signal has to be within the specification. Connect an oscilloscope to Pin ⑤ (CAM IN) of VY-9 Board on the MV-12 board and make sure that the amplitude of the video SYNC signal is approximately 0.15V, that the video block is approximately 0.35V, that the burst signal is 0.15V with flat characteristics, and the signal level ratio between the burst signal and "Red" signal is 0.30: 0.66.

The video signal (colour bar) used in the VTR block adjustment is shown in Fig. 9-2.

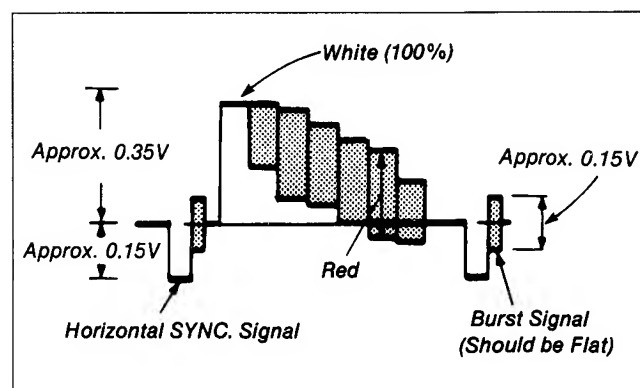
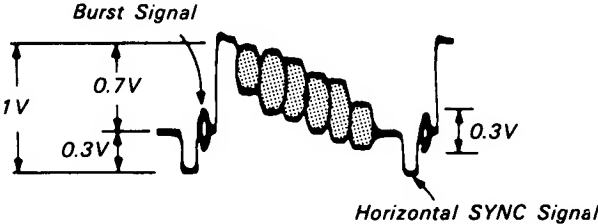
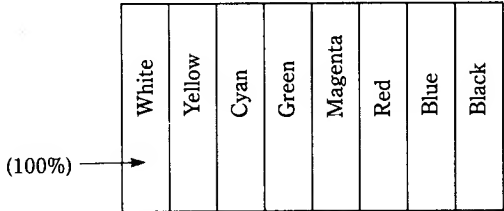


Fig. 9-2. Colour bar signal of pattern generator

# [Alignment Tape]

Tape	Content	Use
Tracking (WR5-1C)	1. Recording area PCM — Video 2. Recording content: CH2: 1MHz linearity adjustment signal (CH1: 9MHz)	Drum linearity adjustment
Video frequency characteristic (WR5-2C)	1. Recording area Video 2. Recording content RF sweep 0 to 10MHz 3. Marker 1, 3.58, 5.5 and 7MHz	Frequency characteristic adjustment
Operation checking SP mode (WR5-3CSP) LP mode (WR5-3CL)  Note: PCM area is not included in WR5-3CL.	1. Recording area Video 2. Recording content <ul style="list-style-type: none"> <li>■ Video track</li> <li>● Video signals               <ul style="list-style-type: none"> <li>Colour bar: 10 sec.</li> <li>Monoscope: 8 sec.</li> </ul> </li> </ul> (Colour bars) <div style="text-align: center;">  <p>Burst Signal</p> <p>Horizontal SYNC Signal</p> </div> <div style="text-align: center;">  </div> <ul style="list-style-type: none"> <li>● Audio signal (AFM) 400Hz, 60% modulation</li> <li>■ PCM track (WR5-3CSP only)</li> <li>● Audio signal (PCM)               <ul style="list-style-type: none"> <li>1kHz, ..... 10 sec.</li> <li>20Hz, ..... 2 sec.</li> <li>400Hz, ..... 4 sec.</li> <li>14kHz, ..... 2 sec.</li> </ul> </li> </ul>	Operation checking

## [Input/output levels and impedance]

Video output Pin jack

Output signal: 1 Vp-p, 75Ω unbalance, negative SYNC

Mic input Mini jack

Input level: -66dBs, low impedance

Audio output Pin jack

Specified output: -10dBs with 47kΩ load

Loading impedance: Over 10kΩ

## 9-1. POWER SUPPLY ADJUSTMENT

### Note:

Regarding power supply adjustment, perform adjustment by the following connector.

### [Connection]

- 1) Remove AC pack or BATTERY from battery grip.
- 2) Connect regulated DC power supply's + side to Pin ③ of CN205 on the MV-12 board (DD UNREG) and – side to Pins ① and ② of CN205 (UNREG GND) and supply  $6.3 \pm 0.1\text{Vdc}$ .
- 3) Connect Pin ③ of CN201 on the MV-12 board ( $\overline{\text{VTR DD ON}}$ ) and GND with jumper wire.

### 9-1-1. DC/DC Converter Frequency Adjustment (MV-12 Board)

Measurement point	Q653 collector
Measurement equipment	Frequency counter
Adjustment element	RV651
Specified value	$475 \pm 5\text{kHz}$

### [Adjustment Method]

- 1) Adjust the frequency to  $475 \pm 5\text{kHz}$  with RV651.

### 9-1-2. DC/DC Converter Output Voltage Adjustment (MV-12 Board)

Measurement point	Pin ⑦ of the VC-11 board
Measurement equipment	Digital voltmeter
Adjustment element	RV652
Specified value	$5.10 \pm 0.05\text{Vdc}$

### [Adjustment Method]

- 1) Adjust the voltage to  $5.10 \pm 0.05\text{Vdc}$  with RV652.

## 9-2. SYSTEM CONTROL ADJUSTMENT

### 9-2-1 Battery Failure Adjustment (MR-8 Board)

#### Note:

Remove the electronic view finder and turn the focus switch to manual position.

Mode	RECORD
Subject	Arbitrary
Measurement point	CN505 pin ① (BATT DOWN) (SS-70 board)
Measurement equipment	Oscilloscope (DC range)
Adjustment element	RV156
Specified value	$5.79 \pm 0.01\text{Vdc}$

### [Connection]

- 1) Remove the AC PACK or BATTERY from the battery grip.
- 2) Connect the regulated DC power supply as shown in Fig. 9-3.
- 3) Connect check land CL351 (Pin ⑦ of CN304) on the SK-19 board and CL352 (Pin ① of CN304) with diode (1SS119 or equivalent) and set to test mode. Refer to Fig. 9-4.

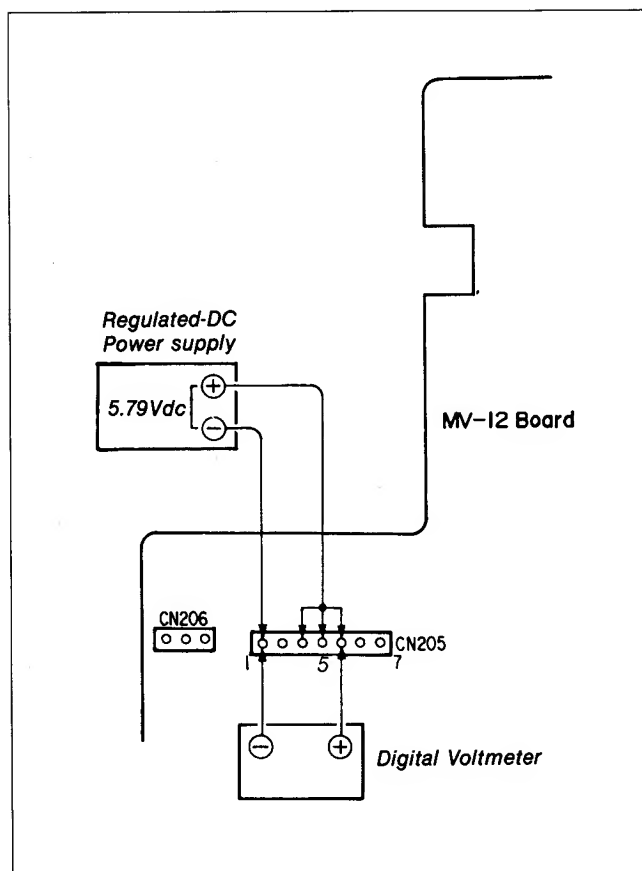


Fig. 9-3.

### Note:

Install camera section and electronic view finder and perform adjustment and checking by making focus switch to "manual".

### [Adjustment Method]

- 1) Adjust the output voltage of the regulated DC power supply unit so that the digital voltmeter will indicate  $5.79 \pm 0.01\text{Vdc}$  (VTR in a recording state)
- 2) Rotate RV156 slowly and set to the point where the DC level of the CN505 pin ① of the SS-70 board is about to change from "H" to "L".

### [Checking Method]

Check as follows, and make readjustment when its result is not satisfactory:

### Note:

Mount the electronic view finder and turn the focus switch to manual position.

- 1) Remove the diode connected between CL351 and CL352 and release the test mode.
- 2) Adjust the output voltage of the regulated DC power supply unit so that the digital voltmeter will indicate  $6.03 \pm 0.01\text{Vdc}$  (VTR in a recording state)
- 3) Check that characters "BATTERY" within the EVF are not lit up, and that the TALLY lamp is not blinking.
- 4) Lower the output voltage of the regulated DC power supply unit so that the digital voltmeter will indicate  $5.75 \pm 0.01\text{Vdc}$ .
- 5) Check that the characters "BATTERY" within the EVF and the TALLY lamp are blinking every other second.

### 9-3. SERVO SYSTEM ADJUSTMENT

#### 9-3-1. Drum Free Speed Adjustment (MR-8 Board)

Mode	PLAYBACK
Signal	Any tape
Measurement point	CN505 pin ⑤ (ADE) (SS-70 board)
Measurement equipment	Digital voltmeter
Adjustment element	RV155
Specified value	$2.1 \pm 0.1\text{Vdc}$

##### [Adjustment Method]

- 1) Adjust to  $2.1 \pm 0.1\text{Vdc}$  with RV155.

#### 9-3-2. Capstan Free Speed Adjustment (MR-8 Board)

Mode	PLAYBACK
Signal	Any tape
Measurement point	CN505 pin ② (C FG) (SS-70 board)
Measurement equipment	Frequency counter
Adjustment element	SP mode: RV151 LP mode: RV152
Specified value	SP mode: $1,154.5 \pm 2\text{Hz}$ LP mode: $578.5 \pm 1.5\text{Hz}$

##### [Connection]

- 1) Connect TP105 on the MR-8 board and GND with a  $220\mu\text{F}/16\text{V}$  electrolytic capacitor. (GND to the negative pole side of the capacitor)
- 2) Connect the CL351 and CL352 of the SK-19 board with a diode (ISS119 or equivalent) for set up TEST mode as shown in Fig. 9-4.

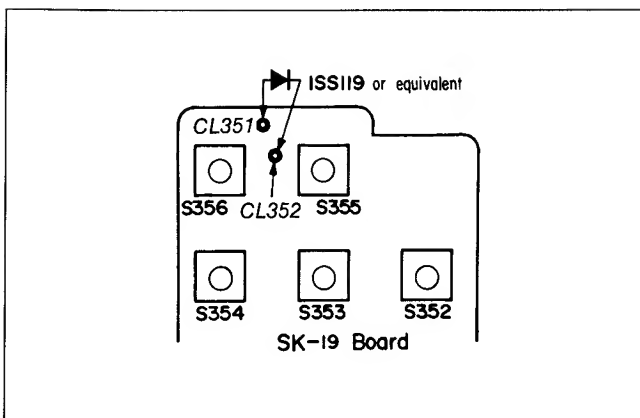


Fig. 9-4.

##### [Adjustment Method]

Adjustment for the LP mode is given in brackets [ ].

- 1) Set the SP/LP switch (S201 on the MV-12 board) to SP [LP] position.
- 2) In the PLAYBACK mode, adjust to  $1,154.5 \pm 2\text{Hz}$  [ $578.5 \pm 1.5\text{Hz}$ ] with RV151 [RV152].

##### Note:

Be sure to adjust SP mode in advance.



$1,154.5 \pm 2\text{Hz}$  (SP Mode)  
 $578.5 \pm 1.5\text{Hz}$  (LP Mode)

Fig. 9-5.

#### 9-3-3. Switching Position Adjustment (MR-8 Board)

Mode	PLAYBACK
Signal	Alignment tape for operation checking (WR5-3CSP)
Measurement point	CH1: Video output terminal CH2: MR-8 board CN105 pin ② (RF SWP)
Measurement equipment	Oscilloscope
Adjustment element	RV153
Specified value	$6.5 \pm 0.3\text{H}$ ( $416 \pm 20\mu\text{sec}$ )

##### [Adjustment Method]

- 1) Adjust to  $6.5 \pm 0.3\text{H}$  ( $416 \pm 20\mu\text{sec}$ ) with RV153.

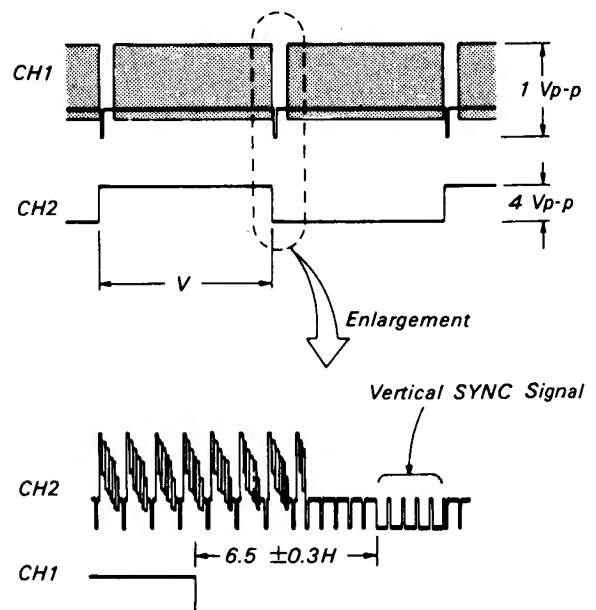


Fig. 9-6.

### 9-3-4. ATF BPF Balance Adjustment (SS-70 Board)

Mode	PLAYBACK (Self recorded tape by SP mode)
Signal	Any signal
Measurement point	Pin ⑪ and ⑫ of IC507 (FL501, FL502)
Measurement equipment	Oscilloscope, audio generator and frequency counter
Adjustment element	RV502
Specified value	A 16kHz signal level (IC507 pin ⑪) should be equal to a 47kHz signal level (IC507 pin ⑫).

#### [Adjustment Method]

- 1) Playback the recorded tape by SP mode.
- 2) Connect the oscilloscope to the IC507 pin ⑫ and read a 47kHz signal level (approx. 2Vp-p).
- 3) Connect the oscilloscope to the IC507 pin ⑪.
- 4) Make the 16kHz signal level equal to the 47kHz signal level with RV502.

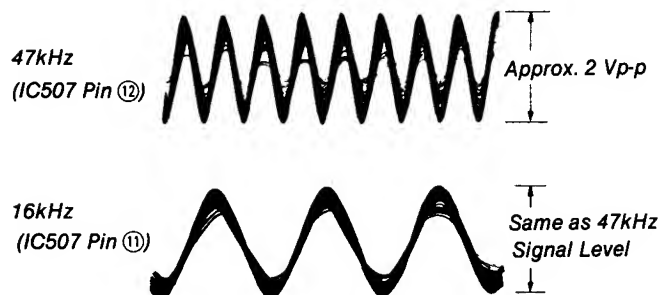


Fig. 9-8.

### 9-4. VIDEO SYSTEM ADJUSTMENT

In principle adjust the video system in the following procedure. Colour video signals fed by a pattern generator are utilized as video input signals for video system adjustment in the RECORD mode. Check that the SYNC and colour burst signals match the standard designated in Fig. 9-2.

#### [Adjustment Procedure]

- 1) Playback frequency characteristic adjustment
- 2) Flying erase check
- 3) X'tal oscillator  $f_0$  adjustment
- 4) Chroma comb filter adjustment
- 5) Y comb type filter adjustment
- 6) SYNC AGC adjustment
- 7) VIDEO OUT level adjustment
- 8) PB Y level adjustment
- 9) Y FM carrier frequency adjustment
- 10) Y FM deviation adjustment
- 11) AC clip adjustment
- 12) 375fH VCO adjustment
- 13) Chroma emphasis  $f_0$  adjustment
- 14) Carrier balance adjustment
- 15) GCA adjustment
- 16)  $f_H$  VCO adjustment
- 17) REC Y recording current adjustment
- 18) REC C recording current adjustment
- 19) REC AFM recording current adjustment
- 20) REC ATF recording current adjustment
- 21) EVF Internal display position adjustment

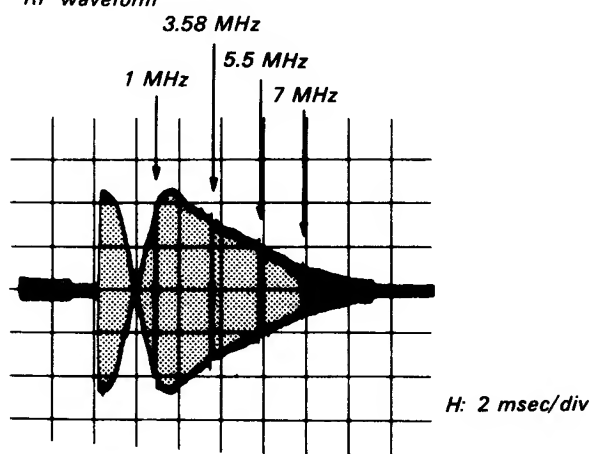


### 9-4-1. Playback Frequency Characteristic Adjustment (RP-34/MR-8 Boards)

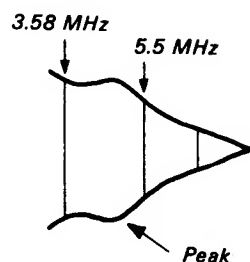
CH2 adjustment is shown in brackets [     ].

Mode	PLAYBACK
Signal	Alignment tape: Frequency characteristic adjustment (WR5-2C)
Measurement point	CN105 pin ④ [③] of MR-8 BOARD External trigger: CN105 pin ② of MR-8 BOARD Trigger slope: + [ - ]
Measurement equipment	Oscilloscope
Adjustment element	RV003 [RV004] of the RP-34 board
Specified value	3.58MHz level : 5.5MHz level = 4:3

a) RF waveform



b)



c)

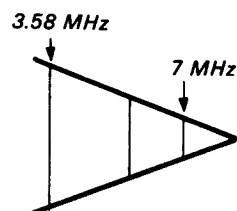


Fig. 9-9.

### [Adjustment Method]

- 1) Adjust with RV003 [RV004] on the RP-34 board so that peak appears in the envelope of the RF waveform. (See Fig. 9-9. b))
- 2) Adjust with RV003 [RV004] on the RP-34 board so that the peak of the RF waveform envelope becomes small and the waveform from 3.58MHz to 7MHz section becomes almost a straight line. (See Fig. 9-9. c))  
At this point, be sure to confirm that the level difference ratio between 3.58MHz and 5.5MHz is approximately 4:3 [4:3].
- 3) Perform self recording and be sure to confirm that there are no occurrence of black noise and white noise due to over modulation.

### 9-4-2. Flying Erase Check (MR-8 Board)

Mode	RECORD
Signal	Arbitrary
Measurement point	TP104 (FE(X))
Measurement equipment	Oscilloscope and frequency counter
Specified value	Frequency: More than 7.4MHz Voltage: More than 7.0Vp-p

### [Checking Method]

- 1) Check that an oscillation frequency is more than 7.4MHz and an oscillation voltage is more than 7.0Vp-p.

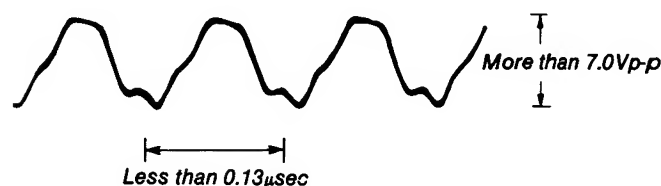


Fig. 9-10.

#### 9-4-3. X'tal Oscillator fo Adjustment (VC-11/MV-12 Board)

Mode	PLAYBACK
Signal	Alignment tape for operation checking (WR5-3CSP)
Measurement point	Pin ⑤ of the VC-11 board (GCA GAIN)
Measurement equipment	Frequency counter
Adjustment element	CV001 of the VC-10 board
Specified value	$4,433,619 \pm 50\text{Hz}$

##### Note:

Connect the frequency counter through a buffer with high impedance (approx.  $10\text{M}\Omega$ ) and low capacity (less than  $10\text{pF}$ ).

##### [Adjustment Method]

- 1) Adjust to  $4,433,619 \pm 50\text{Hz}$  with CV001 of the VC-11 board.

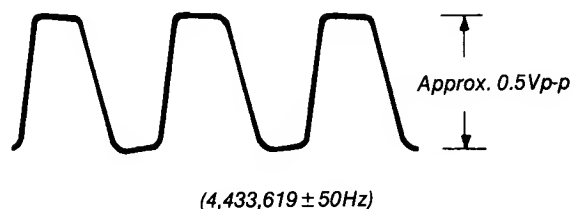


Fig. 9-11.

#### 9-4-4. Chroma Comb Filter Adjustment (VD-6/MV-12 Boards)

Mode	CAMERA STANDBY
Signal	Colour bar
Measurement point	Pin ② of the VD-6 board
Measurement equipment	Oscilloscope
Adjustment element	RV002 on VD-6 board and LV201 of the MV-12 board
Specified value	Minimum residual chroma component

##### [Connection]

- 1) Connect Pin ④ of VY-9 board to GND with a jumper wire.

##### [Adjustment Method]

- 1) Adjust with RV002 of the VD-6 board and LV201 of the MV-12 board alternately so that the residual chrome component becomes minimum.

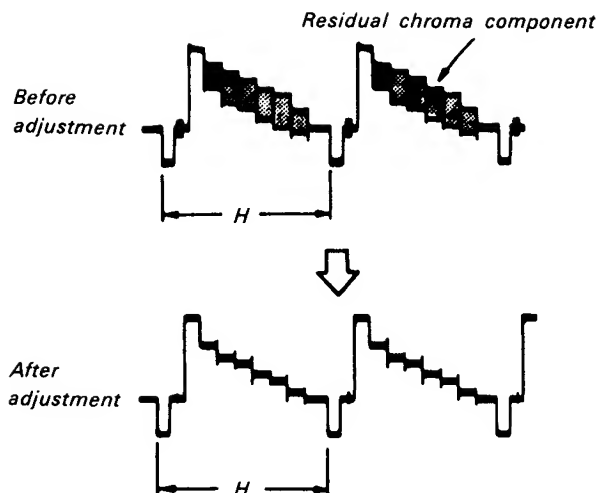


Fig. 9-12.

#### 9-4-5. Y Comb Type Filter Adjustment (VD-6/MV-12 Boards)

Mode	CAMERA STANDBY
Signal	Colour bar
Measurement point	Pin ⑩ of the VD-6 board (TP203)
Measurement equipment	Oscilloscope
Adjustment element	RV001 of the VD-6 board
Specified value	The amplitude between the yellow level center and the pedestal is $50 \pm 25\text{mVp-p}$ .

##### Note:

Be sure to connect a  $22\text{k}\Omega$  of resistor in series between Pin ⑩ on the VD-6 board and 10:1 probe.

##### [Adjustment Method]

- 1) Adjust with RV001 of the VD-6 board so that the amplitude between the yellow level center and pedestal becomes  $50 \pm 25\text{mVp-p}$ .
- 2) While playing back a tape in which dropouts are recorded, be sure to confirm that these dropouts are not discernible. In the event the dropouts become discernible, adjust with RV001 so that they become undiscernible.

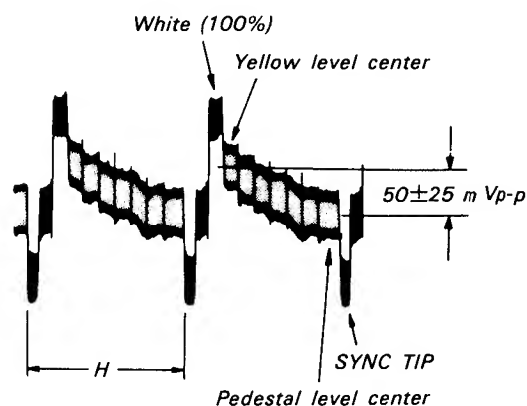


Fig. 9-13.

#### 9-4-6. SYNC AGC Adjustment (VY-9/MV-12 Boards)

Mode	CAMERA STANDBY
Signal	Colour bar
Measurement point	Pin ⑤① of the VY-9 board
Measurement equipment	Oscilloscope
Adjustment element	RV006 of the VY-9 board
Specified value	$0.50 \pm 0.05 V_{p-p}$

##### [Adjustment Method]

- 1) Adjust to  $0.50 \pm 0.05 V_{p-p}$  with RV006 of the VY-9 board.

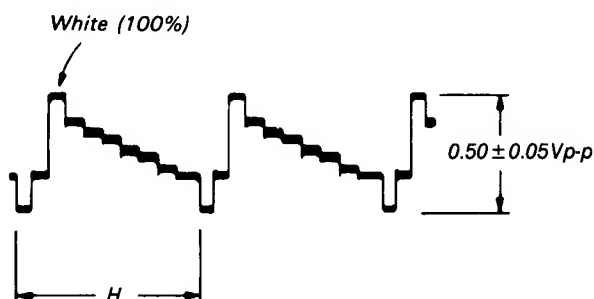


Fig. 9-14.

#### 9-4-7. VIDEO OUT Level Adjustment (VY-9/MV-12 Boards)

Mode	CAMERA STANDBY
Signal	Colour bar
Measurement point	VIDEO OUT terminal of the FP-49 board
Measurement equipment	Oscilloscope
Adjustment element	RV005 of the VY-9 board
Specified value	$1.00 \pm 0.05 V_{p-p}$

##### Note:

Terminate the VIDEO OUT terminal with a  $75\Omega$  resistor.

##### [Adjustment Method]

- 1) Adjust to  $1.00 \pm 0.05 V_{p-p}$  with RV005 of the VY-9 board.

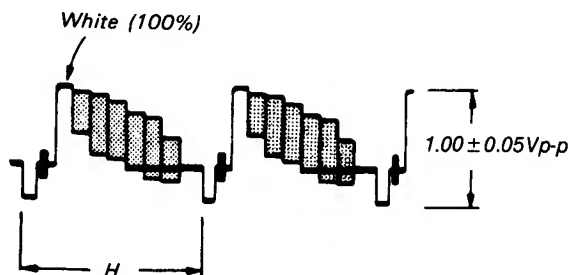


Fig. 9-15.

#### 9-4-8. PB Y Level Adjustment (VY-9/MV-12 Boards)

Mode	PLAYBACK
Signal	Alignment tape for operation checking (WR5-3CSP), colour bar portion
Measurement point	VIDEO OUT terminal of the FP-49 board
Measurement equipment	Oscilloscope
Adjustment element	RV001 of the VY-9 board
Specified value	$1.00 \pm 0.05 V_{p-p}$

##### Notes:

- 1) Terminate the VIDEO OUT terminal with a  $75\Omega$  resistor.
- 2) The EDIT (SP/LP) switch (MV-12 board, S201) should be OFF (SP) position.

##### [Adjustment Method]

Adjust to  $1.00 \pm 0.05$  with RV001 of the VY-9 board.

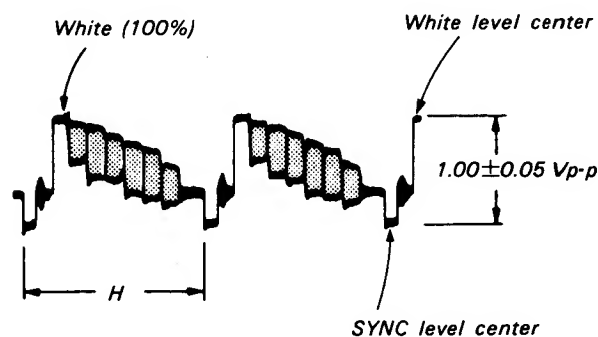


Fig. 9-16.

#### 9-4-9. Y FM Carrier Frequency Adjustment (VY-9/MV-12 Boards)

Mode	CAMERA STANDBY
Signal	None
Measurement point	Pin ②⑨ (REC Y RF) of the VY-9 board
Measurement equipment	Frequency counter
Adjustment element	RV004 of the VY-9 board
Specified value	$4.20 \pm 0.03 \text{ MHz}$

##### [Adjustment Method]

- 1) Set RV003 (AC CLIP) of the VY-9 board to the mechanical center (slide terminal for RV003 being approx. 2.7Vdc).
- 2) Adjust to  $4.20 \pm 0.03 \text{ MHz}$  with RV004 of the VY-9 board.
- 3) Make "deviation adjustment" and "AC clip adjustment".

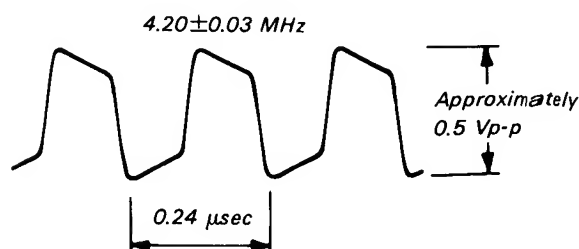


Fig. 9-17.

#### 9-4-10. Y FM Deviation Adjustment (VY-9/MV-12 Boards)

Mode	RECORD and PLAYBACK
Signal	Colour bar
Measurement point	VIDEO OUT terminal of the FP-49 board
Measurement equipment	Oscilloscope
Adjustment element	RV002 of the VY-9 board
Specified value	Playback level at $1.00 \pm 0.05V_{p-p}$

##### Notes:

- 1) Terminate the VIDEO OUT terminal with a  $75\Omega$  resistor.
- 2) "VIDEO OUT level adjustment", "PB Y level adjustment" and "Y FM carrier frequency adjustment" should be already completed.
- 3) The EDIT (SP/LP) switch (MV-12 board, S201) should be OFF (SP) position.

##### [Adjustment Method]

- 1) Record colour bar signal.
- 2) Playback a recorded portion.
- 3) Confirm a playback output level.  
Standard:  $1.00 \pm 0.05V_{p-p}$
- 4) When the standard is not met, repeat the above-mentioned steps 1) through 3) after turning RV002 of the VY-9 board as follows:

	RV002 Rotating Direction
Larger than specified value	Clockwise (↻)
Smaller than specified value	Counter-clockwise (↺)

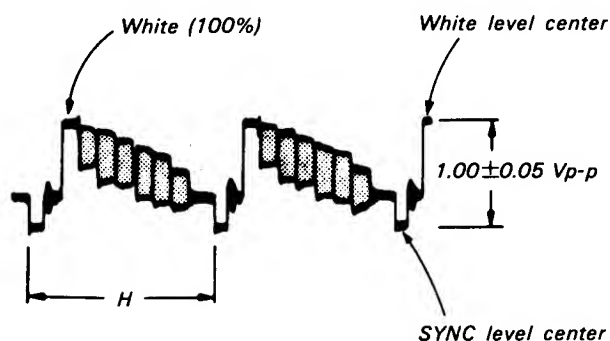


Fig. 9-18.

#### 9-4-11. AC Clip Adjustment (VY-9/MV-12 Boards)

Mode	CAMERA STANDBY
Signal	Colour bar
Measurement point	Pin ③⑤ of the VY-9 board
Measurement equipment	Oscilloscope
Adjustment element	RV003 of the VY-9 board
Specified value	$235 \pm 10\%$

##### [Adjustment Method]

- 1) Adjust the peak of white (100%) to  $235 \pm 10\%$  with RV003 of the VY-9 board.

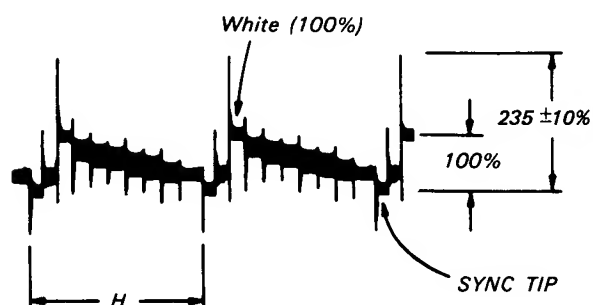


Fig. 9-19.

#### 9-4-12. 375fh VCO Adjustment (VC-11/MV-12 Boards)

Mode	CAMERA STANDBY
Signal	Colour bar
Measurement point	Pin ⑥⑩ of the VC-11 board
Measurement equipment	Digital voltmeter
Adjustment element	RV002 of the VC-11 board
Specified value	$3.0 \pm 0.4V_{dc}$

##### [Adjustment Method]

- 1) Adjust to  $3.0 \pm 0.4V_{dc}$  with RV002 of the VC-11 board.

#### 9-4-13. Chroma Emphasis $f_0$ Adjustment (MV-12 Board)

Mode	CAMERA STANDBY
Signal	Colour bar
Measurement point	Pin ⑧ of the VC-11 board
Measurement equipment	Oscilloscope
Adjustment element	FL203 of the MV-12 board
Specified value	Be sure to confirm that the $f_0$ component is minimum and zero cross appears between green and magenta.

##### [Connection]

Connect the following two places of the VC-11 board with 47k $\Omega$  resistors.

- ⑪ PIN (ACC) — ⑦② PIN (GND)
- ⑪ PIN (ACC) — ⑦① PIN (REG 5V)

##### [Adjustment Method]

- Adjust with FL203 of the MV-12 board so that the amplitude of the flat cyan section of the chroma signal becomes minimum.

At this point, be sure to confirm that the zero cross appears between the green and magenta.

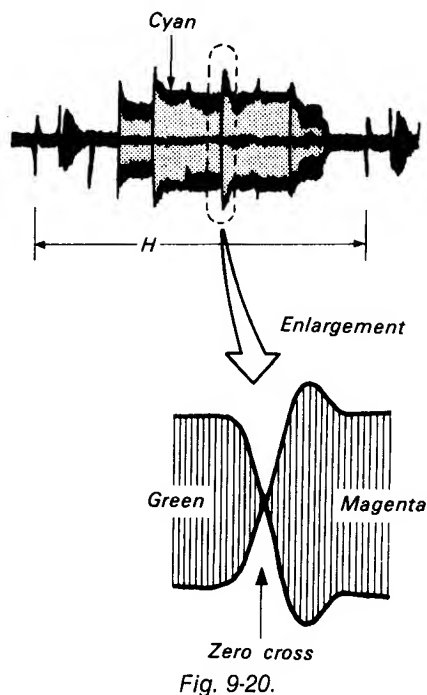


Fig. 9-20.

#### 9-4-14. Carrier Balance Adjustment (VC-11/MV-12 Boards)

Mode	CAMERA STANDBY
Signal	Colour bar
Measurement point	Pin ⑥④ of the VC-11 board
Measurement equipment	Oscilloscope
Adjustment element	RV001 of the VC-11 board
Specified value	5.17MHz component at minimum

##### [Adjustment Method]

- Minimize 5.17MHz component with RV001 of the VC-11 board.

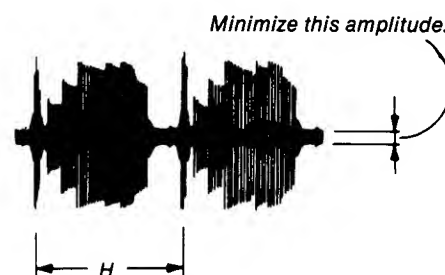


Fig. 9-21.

#### 9-4-15. GCA Adjustment (VC-11/MV-12 Boards)

Mode	Playback
Signal	Arbitrary tape
Measurement point	Pin ⑥④ of the VC-11 board
Measurement equipment	Oscilloscope
Adjustment element	RV003 of the VC-11 board
Specified value	$520 \pm 15\text{mVp-p}$

##### [Adjustment Method]

- Adjust with RV003 of the VC-11 board so that it becomes  $520 \pm 15\text{mVp-p}$ .
- Set to either the STILL, CUE or REVIEW mode, and be sure to confirm that the thickness of the colour does not differ from that of the playback mode. If necessary, adjust with RV003. (Be sure to playback a tape of LP mode.)

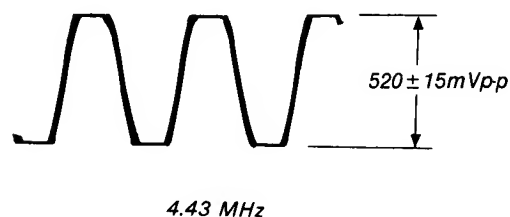


Fig. 9-22.

#### 9-4-16. f<sub>H</sub> VCO Adjustment (VC-11/MV-12 Boards)

Mode	CAMERA STANDBY
Signal	Colour bar
Measurement point	CH1: Pin ⑤ of the VC-11 board CH2: VIDEO OUT terminal of the FP-49 board
Measurement equipment	Oscilloscope
Adjustment element	RV004 of the VC-11 board
Specified value	$14.5 \pm 0.2 \mu\text{sec}$

##### [Adjustment Method]

- 1) Adjust RV004 of the VC-11 board so that the  $T_R$  of CH1 is  $14.5 \pm 0.2 \mu\text{sec}$ .
- 2) Confirm that the H (time) of CH1 and CH2 is stable.

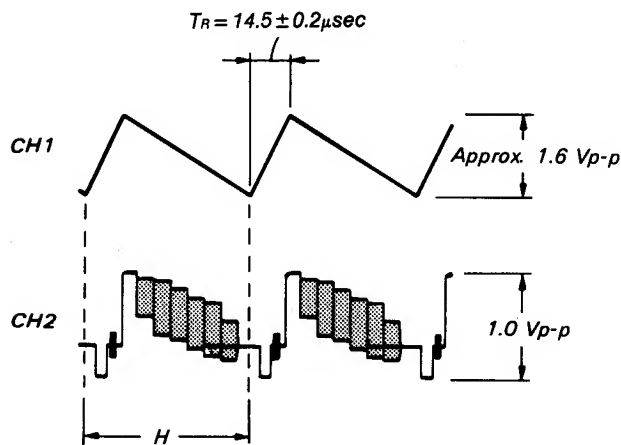


Fig. 9-23.

#### 9-4-17. REC Y Recording Current Adjustment (RP-34/MR-8 Boards)

Mode	RECORD
Signal	None
Measurement point	TP101 (CH1 CHECK) of the MR-8 board
Measurement equipment	Oscilloscope
Adjustment element	RV001 of the RP-34 board
Specified value	205mVp-p

##### Note:

After REC Y recording current adjustment, be sure to carry out each of REC C, REC AFM and REC ATF recording current adjustments.

##### [Adjustment Method]

- 1) Adjust to 205mVp-p with RV001 of the RP-34 board.

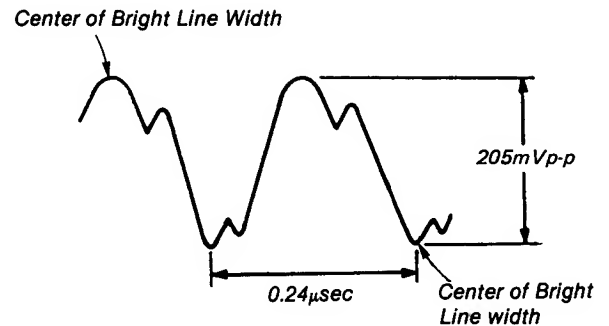


Fig. 9-24.

#### 9-4-18. REC C Recording Current Adjustment (MV-12 Board)

Mode	RECORD
Signal	Color bar
Measurement point	TP101 (CH1 CHECK) of the MR-8 board
Measurement equipment	Oscilloscope
Adjustment element	RV203
Specified value	35.3mVp-p

##### Notes:

- 1) After REC C recording current adjustment, be sure to carry out each of REC AFM and REC ATF recording current adjustments.
- 2) Use MP type tape.

##### [Connection]

- 1) Connect the following two places of the MV-12 board with jumper wires:
  1. Pin ⑳ (REC Y RF) of the VY-9 board and GND
  2. CN201 pin ⑦ (PB ATF PILOT) and GND
- 2) Connect the following place of the AU-31 board with a jumper wire:
  1. Pin ⑳ (REC AFM) of the AU-31 board and GND.

##### [Adjustment Method]

- 1) Adjust to 35.3mVp-p with RV203.

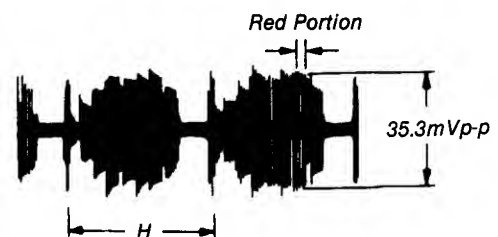


Fig. 9-25.

#### 9-4-19. REC AFM Recording Current Adjustment (MV-12 board)

Mode	RECORD
Signal	None
Measurement point	TP101 (CH1 CHECK) of the MR-8 board
Measurement equipment	Oscilloscope
Adjustment element	RV201
Specified value	8.0mVp-p

##### Note:

- 1) Use MP type tape.
- 2) When a TP101 of the MR-8 board signal level is too low to read, connect directly through a 100Ω resistor as shown in the figure below instead of using a probe of 10:1.

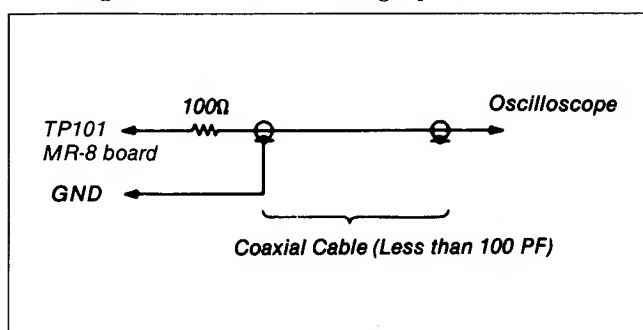


Fig. 9-26.

##### [Connection]

- 1) Connect the following two places in the MV-12 board with jumper wires:
  1. Pin ⑳ (REC Y RF) of the VY-9 board and GND
  2. CN201 pin ⑦ (PB ATF PILOT) and GND

##### [Adjustment Method]

- 1) Adjust to 8.0mVp-p with RV201 of the MV-12 board.

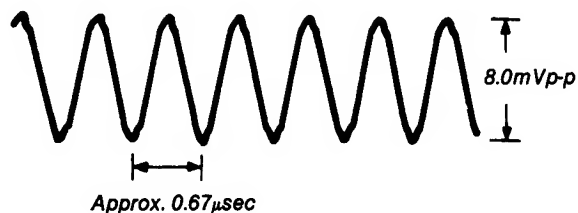


Fig. 9-27.

#### 9-4-20. REC ATF Recording Current Adjustment (MV-12 Board)

Mode	RECORD
Signal	None
Measurement point	TP101 (CH1 CHECK) of the MR-8 board
Measurement equipment	Oscilloscope
Adjustment element	RV202
Specified value	7.0mVp-p

##### [Adjustment Method]

- 1) Set the SP/LP switch (S201 of the MV-12 board)
- 2) Use MP type tape.
- 3) When a TP101 of the MR-8 board signal level is too low to read, connect directly through a 100Ω resistor as shown in the figure below instead of using a probe of 10:1.

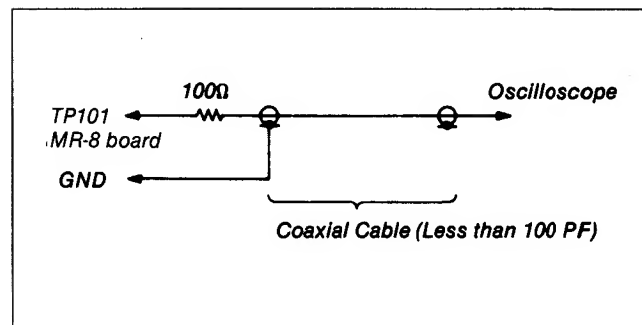


Fig. 9-28.

##### [Connection]

- 1) Connect the following place of the MV-12 board with a jumper wire:
  - Pin ⑳ (REC Y RF) of the VY-9 board and GND
- 2) Connect the following place of the AU-31 board with a jumper wire.
  - Pin ⑳ (REC AFM) of the AU-31 board and GND

##### [Adjustment Method]

- 1) Adjust to 7.0mVp-p with RV202.

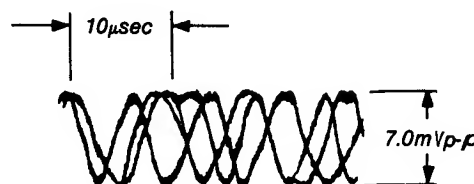


Fig. 9-29.



#### 9-4-21. EVF Internal Display Position Adjustment (MV-12 Board)

Mode	CAMERA STANDBY
Subject	All black (Set the food cap)
Measurement point	Pin ② of CN207 (VF OUT)
Measurement equipment	Oscilloscope
Adjustment element	CV201
Specified value	$8.5 \pm 0.8 \mu\text{sec}$

##### [Adjustment Method]

- 1) Adjust to  $8.5 \pm 0.8 \mu\text{sec}$  with CV201.

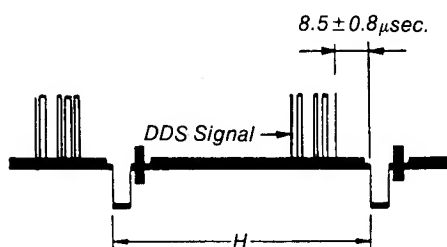


Fig. 9-30.

#### 9-5. AUDIO SYSTEM ADJUSTMENT

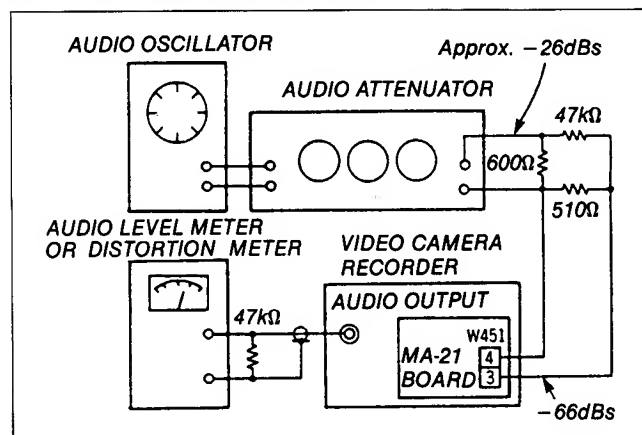


Fig. 9-31.

##### 9-5-1. AFM Carrier Frequency Adjustment (AU-31 Board)

Mode	RECORD (SP mode)
Signal	None
Measurement point	Flat cable pin ⑳ (REC AFM) (IC401 pin ⑭)
Measurement equipment	Frequency counter
Adjustment element	RV401
Specified value	$1.500 \pm 0.002 \text{MHz}$

##### [Adjustment Method]

- 1) Adjust to  $1.500 \pm 0.002 \text{MHz}$  with RV401

##### 9-5-2. AFM Deviation Adjustment (AU-31 Board)

Mode	PLAYBACK
Signal	Alignment tape for operation checking (WR5-3CSP)
Measurement point	Audio output terminal
Measurement equipment	Audio level meter
Adjustment element	RV402
Specified value	$-10 \pm 0.2 \text{dBs}$

##### [Adjustment Method]

- 1) Adjust the audio output level to  $-10 \pm 0.2 \text{dBs}$  with RV402.

##### 9-5-3. E-E Output Level Check

Mode	E-E
Signal	400Hz, $-66 \text{dBs}$
Measurement point	See Fig. 9-31.
Measurement equipment	Audio level meter
Specified value	$-10 \pm 3 \text{dBs}$

##### [Checking Method]

- 1) Be sure the audio output level is  $-10 \pm 3 \text{dBs}$ .

#### 9-5-4. Overall Level Characteristic Check

Mode	SELF RECORD & PLAYBACK
Signal	400Hz, -66dBs
Measurement point	See Fig. 9-31.
Measurement equipment	Audio level meter
Specified value	-10 ± 3dBs

##### [Checking Method]

- 1) Record signals.
- 2) Playback recorded portions.
- 3) The audio output level should be -10 ± 3dBs.

#### 9-5-5. Overall Distortion Check

Mode	SELF RECORD & PLAYBACK
Signal	400Hz, -66dBs
Measurement point	See Fig. 9-31.
Measurement equipment	Distortion meter
Specified value	Less than 0.5%*1

##### [Checking Method]

- 1) Record signals.
- 2) Playback recorded portions.
- 3) A distortion should be less than 0.5%\*1.

\*1 This value applies when a distortion measuring filter (Fig. 9-32) is used (approx. 1.0% when the filter is not used).

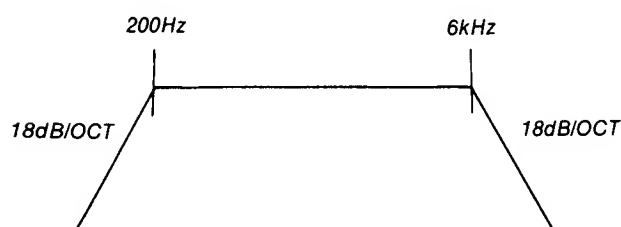


Fig. 9-32.

#### 9-5-6. Overall Noise Level Check

Mode	SELF RECORD & PLAYBACK
Signal	None Short-circuit with a jumper wire between W451 pins ③ and ④ (GND) of the MA-21 board.
Measurement point	See Fig. 9-31.
Measurement equipment	Audio level meter
Specified value	Less than -56dBs*2

##### [Checking Method]

- 1) Record signals.
- 2) Playback recorded portions.
- 3) A noise level should be less than -56dBs.\*2

\*2 This value applies when an IHF-A auditory correction filter is used.

## 9-6. ELECTRONIC VIEW FINDER SYSTEM ADJUSTMENT

#### 9-6-1. Horizontal Slant Adjustment

Mode	PLAYBACK
Signal	Alignment tape for operation checking (WR5-3CSP), monoscope portion
Specified value	See Fig. 9-33.

##### [Adjustment Method]

- 1) Adjust RV955 (BRIGHT) to provide easy-to-view brightness for the CRT.
- 2) Loosen the DY (Deflection Yoke) fastening band.
- 3) Rotate the DY to make a picture horizontal.
- 4) Adjust to  $53.3 \pm 0.3\text{mm}$  a distance between the CRT surface and the rear end of the DY.
- 5) Tighten the DY fastening band. (Do not tighten too much.)

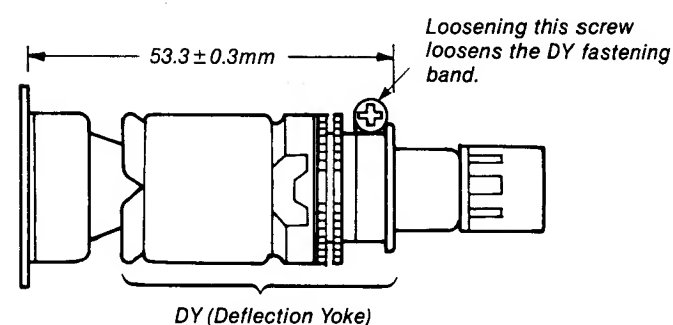
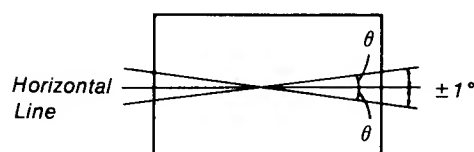


Fig. 9-33.



Specified value: A picture should be within  $\pm 1^\circ$  of the horizontal line.

Fig. 9-34.

### 9-6-2. Centering Adjustment

Mode	PLAYBACK
Signal	Alignment tape for operation checking (WR5-3CSP), monoscope portion
Specified value	See Fig. 9-36.

#### [Adjustment Method]

- 1) Adjust the screen uniformly in both vertical and horizontal directions with the centering magnet.

#### Note:

Since a centering position changes due to an effect of terrestrial magnetism, rotate 360° in the horizontal direction and adjust at the center of displacement.

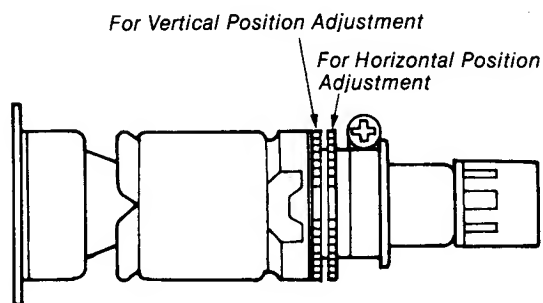


Fig. 9-35.

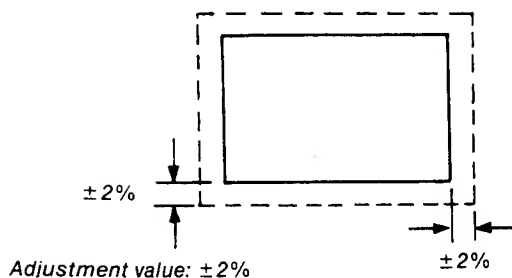


Fig. 9-36.

### 9-6-3. AFC Adjustment (VF-10 Board)

Mode	PLAYBACK
Signal	Alignment tape for operation checking (WR5-3CSP)
Measurement point	Pin ⑩ of IC951
Measurement equipment	Digital voltmeter or oscilloscope (DC range)
Adjustment element	RV952
Specified value	$2.65 \pm 0.1\text{Vdc}$

#### [Adjustment Method]

- 1) Adjust to  $2.65 \pm 0.1\text{Vdc}$  with RV952.

### 9-6-4. Horizontal Amplitude Adjustment (VF-10 Board)

Mode	PLAYBACK
Signal	Alignment tape for operation checking (WR5-3CSP), monoscope portion
Adjustment element	C968, 969
Specified value	$6 \pm 3\%$

#### [Adjustment Method]

- 1) Adjust a focus with RV954.
- 2) Turn RV951, and conform the top and bottom of a monoscope picture to the top and bottom edges of the screen.
- 3) Turn RV955 to obtain a normal level of brightness.
- 4) Short or open the patterns (A, B) of the H-size adjusting capacitors (C968 and C969) sequentially to adjust horizontal overscanning to  $6 \pm 3\%$  (each of right and left). (See Fig. 9-37)

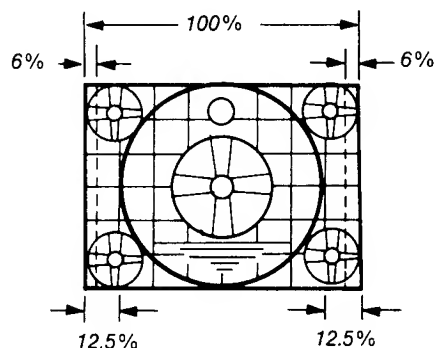
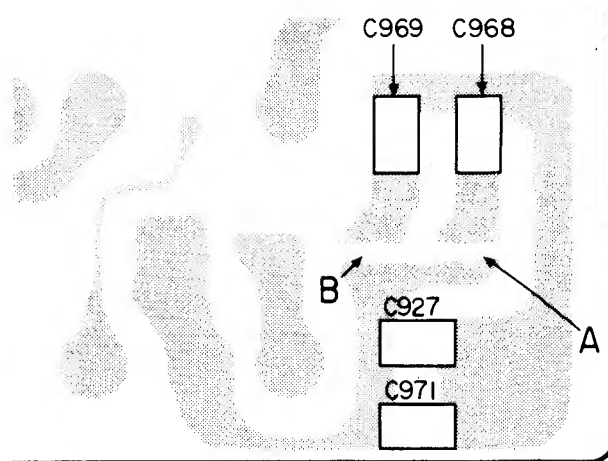


Fig. 9-37.



A	B	H Size
Open	Open	Small
Short	Open	
Open	Short	
Short	Short	Large

Fig. 9-38.

#### 9-6-5. Vertical Amplitude Adjustment (VF-10 Board)

Mode	PLAYBACK
Signal	Alignment tape for operation checking (WR5-3CSP), monoscope portion
Adjustment element	RV951
Specified value	$6 \pm 3\%$

##### [Adjustment Method]

- 1) Adjust vertical overscanning to  $6 \pm 3\%$  (each of top and bottom) with RV951.

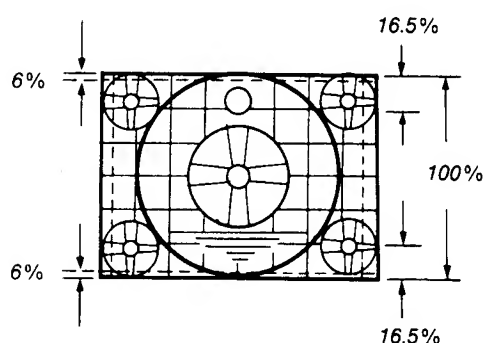


Fig. 9-39.

#### 9-6-6. Brightness and Contrast Adjustment (VF-10 Board)

Mode	PLAYBACK
Signal	Alignment tape for operation checking (WR5-3CSP), monoscope portion
Adjustment element	Brightness: RV955 Contrast: RV953

##### [Adjustment Method]

- 1) Adjust RV955 and RV953 alternately so that the light and shade of the gray scale will be correctly displayed.  
(The light area should not be so bright that the cross hatch inside the monoscope circle becomes dim. The shade area should not be so dark that the darkest and second darkest parts of the gray scale cannot be distinguished from each other.)

#### 9-6-7. Focus Adjustment (VF-10 Board)

Mode	PLAYBACK
Signal	Alignment tape for operation checking (WR5-3CSP), monoscope portion
Adjustment element	RV954

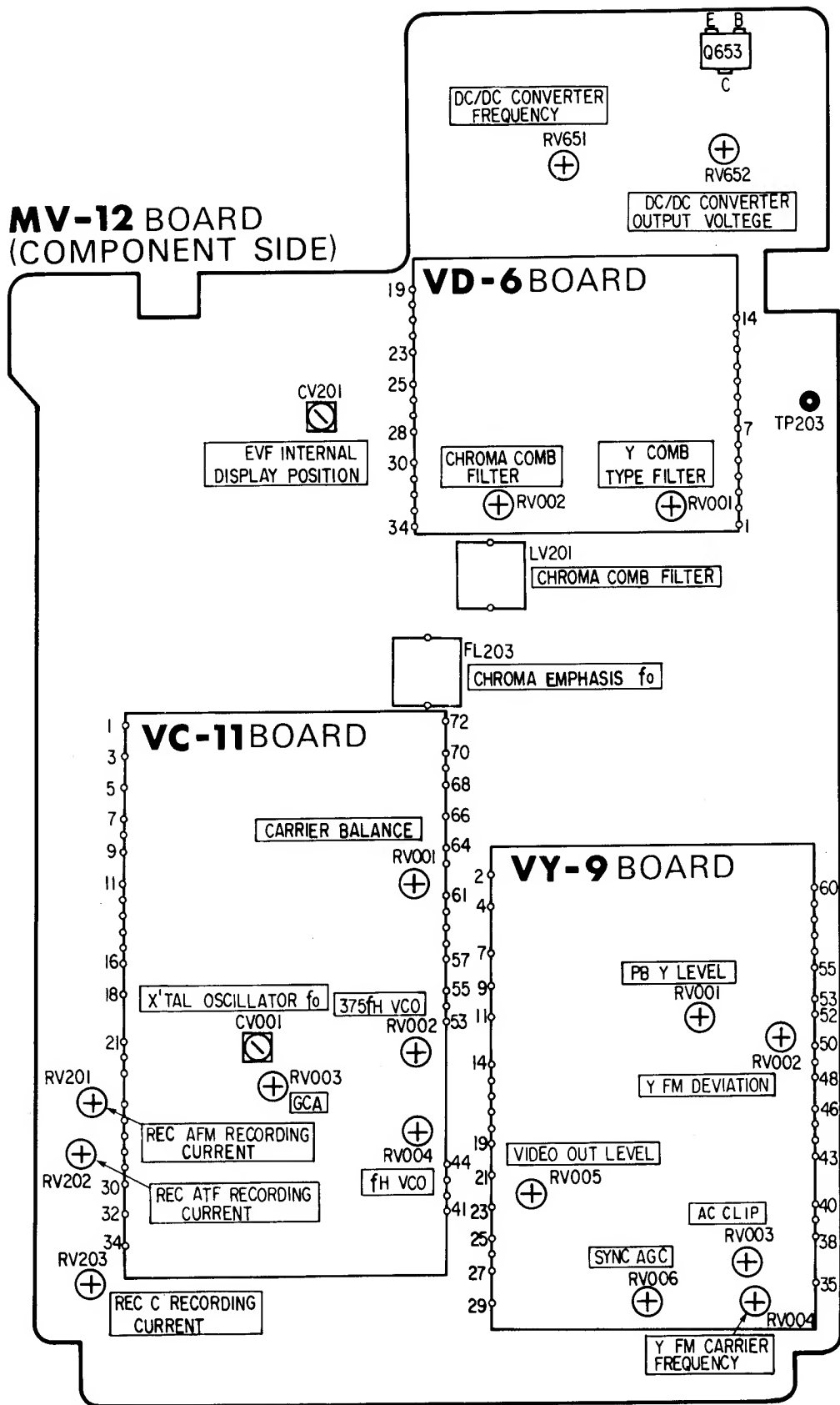
##### [Adjustment Method]

- 1) Adjust to the best focus point with RV954.

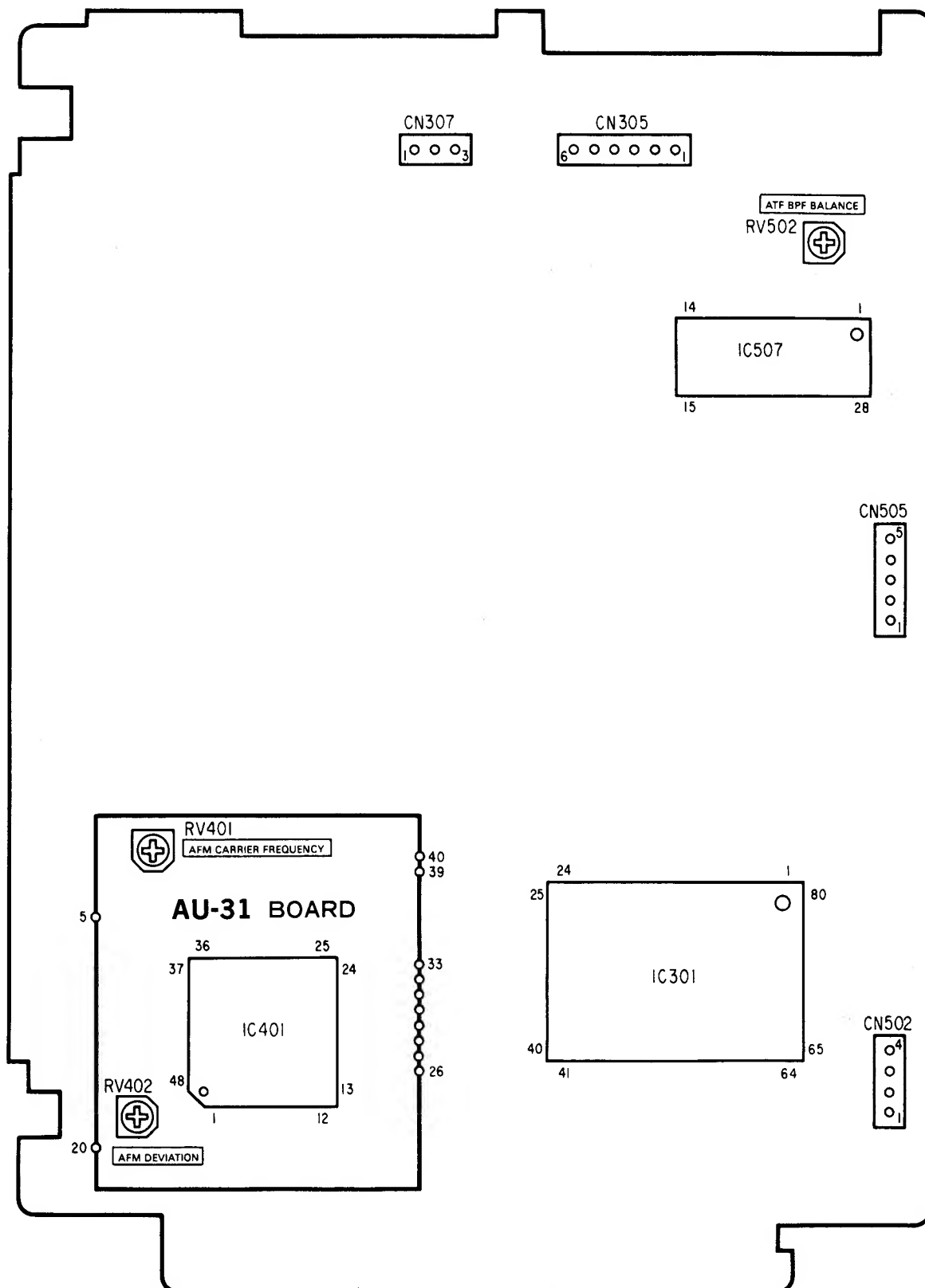
#### 9-6-8. Horizontal and Vertical Amplitude Confirmation

Results of horizontal amplitude adjustment in 9-6-4 and vertical amplitude adjustment in 9-6-5 should meet their specified values, respectively. If not met, make readjustments. In this case, carry out both brightness and contrast adjustment in 9-6-6 and focus adjustment in 9-6-7 again.

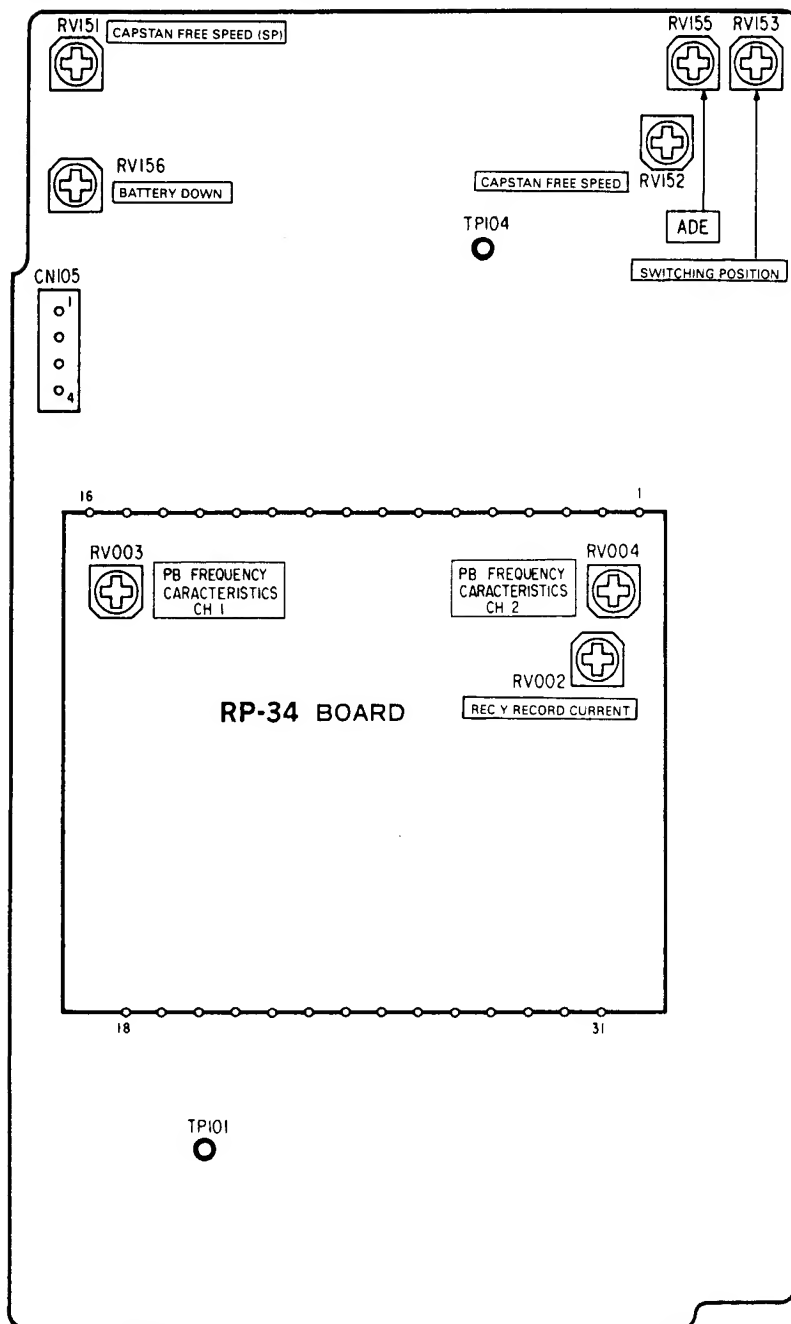
# 9-7. ADJUSTMENT ELEMENT LOCATION



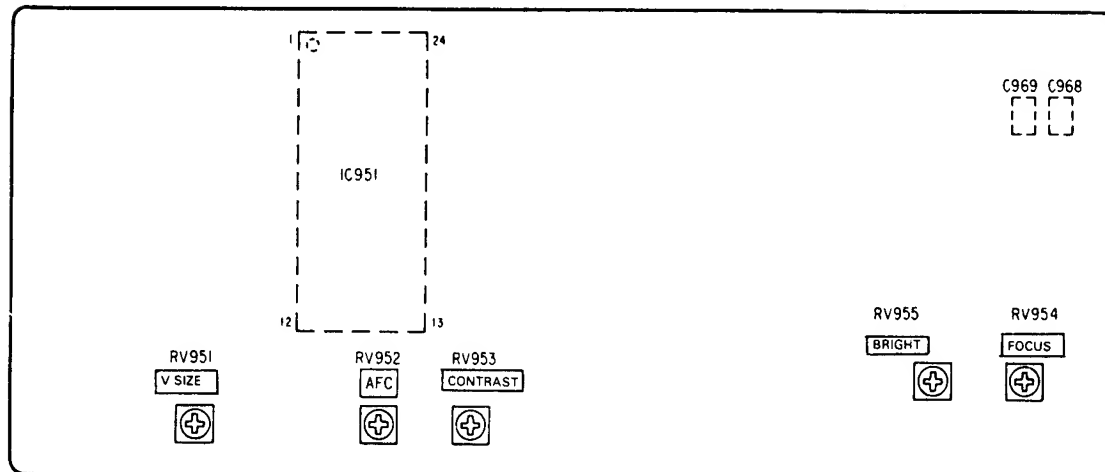
# **SS-70 BOARD (COMPONENT SIDE)**



## MR-8 BOARD (COMPONENT SIDE)



## VF-10 BOARD (COMPONENT SIDE)





## SONY<sup>®</sup> SERVICE MANUAL

AEP Model  
UK Model  
E Model


### SUPPLEMENT-1

**Subject : Australian model is now available  
and partial change of parts of AEP  
model.**

File this supplement with the service manual.

- In the AEP model, parts to sets after serial No. 400,001 have been changed.

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No.	Part No.	Description	Remark
4	X-3713-705-1	CABINET (R) ASSY	5
Changed: 	X-3713-796-1	CABINET (R) ASSY (WEST GERMANY MODEL)	
6	* 3-719-384-01	LABEL, MODEL NUMBER (UK/E/SWITZERLAND/AS MODEL)	
	* 3-720-504-01	LABEL, MODEL NUMBER (AEB): Serial No. 400,001 and later	

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##### ACCESSORIES AND PACKING MATERIALS \*\*\*\*\*

Part No.	Description	Remark
* 3-719-812-01	CARTON, OUTER (AEP/E/UK MODEL)	Serial No. 400,001 and later
* 3-719-812-31	CARTON, OUTER (AS MODEL)	
* 3-719-812-41	CARTON, OUTER (WEST GERMANY MODEL)	
3-769-231-11	MANUAL, INSTRUCTION (ENGLISH): AEP/E/UK/AS MODEL	
3-769-231-81	MANUAL, INSTRUCTION (GERMAN): WEST GERMANY MODEL /Serial No. 400,001 and later	
1-558-975-21	CORD, CONNECTION	
1-570-730-11	SWITCH, ANTENNA (ANS-37)	
3-712-673-01	SCREW DRIVER	
* 3-720-523-01	CUSHION (UPPER)	
* 3-720-524-01	CUSHION (LOWER)	
* 3-720-525-01	CARTON, OUTER	

##### ACCESSORY KIT

A-6767-226-A	MODULATOR ASSY (AEP/E MODEL)
A-6767-227-A	MODULATOR ASSY (UK MODEL)
A-6767-348-A	MODULATOR ASSY (AS MODEL)

##### NOTE:

- Items marked "\*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.